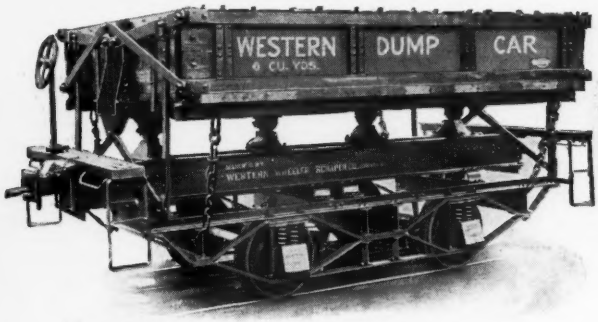
Pit and Quarry
SAND • GRAVEL • STONE
HANDLING • CRUSHING • SCREENING • WASHING

Vol 10 ap - Se 1925

Will Stand More Grief



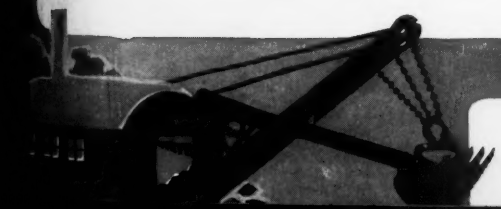
Western 6-Yard Dump Car (Standard Gauge)

"Western Dump Cars will stand more grief than any other dump car that is built."

The superintendent of steam shovel work is talking.

Tell us your haulage problem. There is a Western dump car to meet every haulage requirement. Write to-day.

WESTERN WHEELED SCRAPER COMPANY
FOUNDED 1877
Earth and Stone Handling Equipment
AURORA, ILLINOIS



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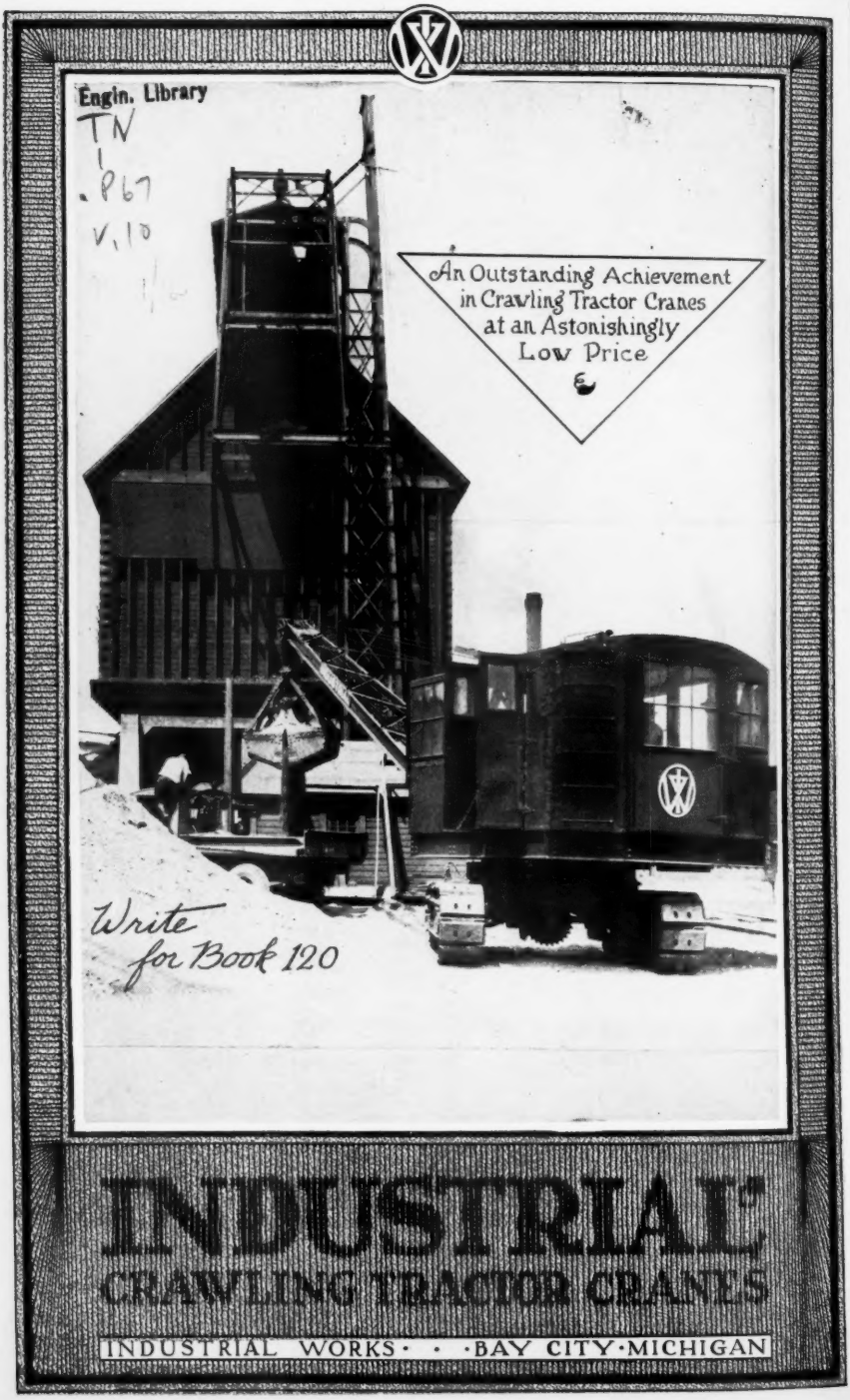

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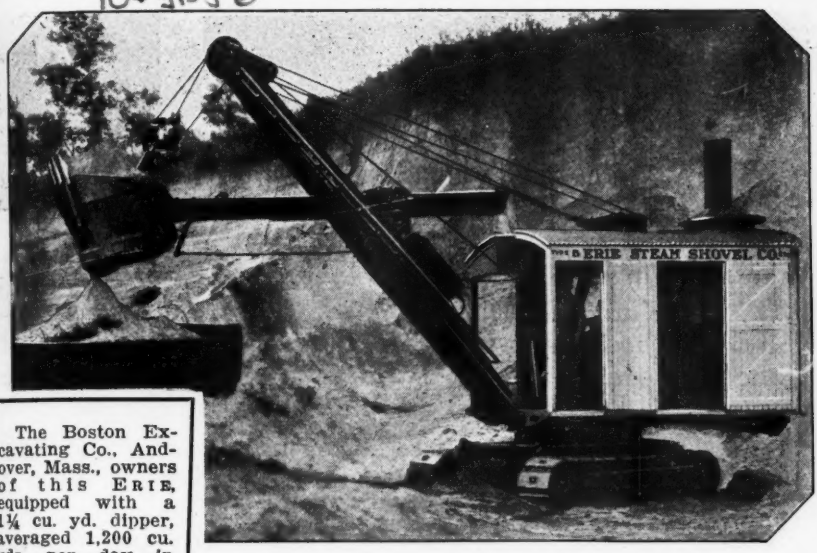


The Boston Excavating Co., Andover, Mass., owners of this ERIE, equipped with a 1¼ cu. yd. dipper, averaged 1,200 cu. yds. per day in bank excavation.

The *SURE Thing*—

You can get out a bigger output every day—and make *larger* profits that are *steady*, with an ERIE. In a year of strong demand for sand, gravel and stone, you want to be certain of big output every day.

Producers who have had the widest experience with different shovels use ERIES. After they have had results like these, they are hard to please:

"During the past 5 years one of our ERIES has handled 750,000 cu. yds. It is economical to maintain, and handles more material than any other shovel its size. Our experience has shown the ERIE to be the best shovel on the market, and when we need another shovel we will buy another ERIE."—Ashleigh Harleston, Pres. Harleston Gravel Co., Greenwood, Miss. (Owns 2 ERIES).

Month after month, your ERIE keeps loading out the material without a shutdown for repairs. Hundreds of carefully kept records have proved that an ERIE saves ⅔ of repair cost and makes A CORRESPONDING SAVING IN WORKING TIME.

We will be glad to show just what output a reliable ERIE will give in your quarry or gravel pit; write us.

ERIE STEAM SHOVEL CO., Erie, Pa., U. S. A.

Incorporated 1883. Builders of ERIE Shovels, Cranes, Draglines, Trench Hoes, etc.
Branch Offices: Boston, New York, Philadelphia, Pittsburgh, Atlanta, Chicago
Representatives throughout the U. S. A.

ERIE Revolving Shovels

KOEH

Smooth Speed and Precision

.... those are the factors of extra Crane excavator capacity, and both are secured in the Koehring by means of the 66% greater contact surfaces of the Koehring double outside band, self-equalizing clutch!

The greater friction area does away with grab and jerk, picks up the load with easy, swift sureness. The whole Koehring action is smooth and alertly responsive to the control levers.

Because clutch is easy, control levers are easy. No need for mechanical lever-shifting help on the Koehring. The Finger-tip control of the Koehring adds no mechanical complications. The operator does not lose the "feel" of the work — and behind the Koehring operating speed, is Koehring Heavy Duty Construction!

KOEHRING COMPANY

PAVERS, MIXERS—GASOLINE CRANES, DRAGLINES AND SHOVELS

MILWAUKEE, WISCONSIN

Sales Offices and Service Warehouses in principal cities

Foreign Dept., Room 1370, 50 Church St., N. Y.
Canada, Koehring Company of Canada, Ltd., 105 Front St., East, Toronto, Ontario.
Mexico, F. S. Lapum, Cinco de Mayo 21, Mexico, D. F.

RING

Crane Excavator

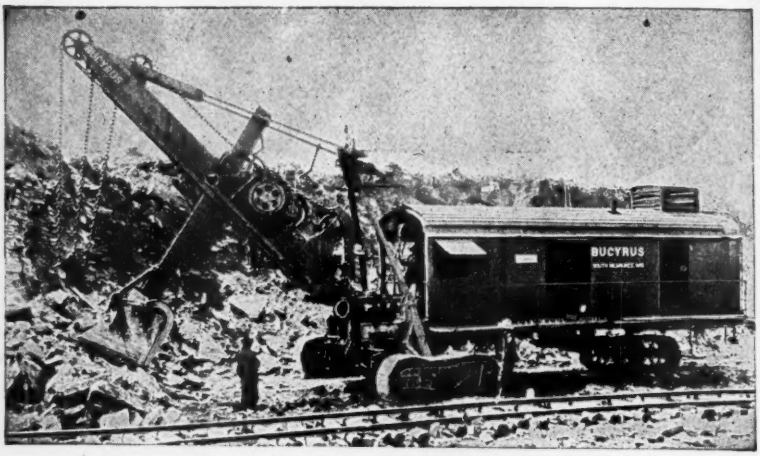
Crane Capacities

No. 1 — 10 tons at 12 ft. radius. ¾-cu. yd. clamshell bucket, sand or gravel, at 30 ft. radius. Boom lengths to suit conditions. 4-cylinder, 5x6 in. gasoline engine, 1,000 R. P. M.

No. 2 — 15 tons at 12 ft. radius. Handles following loads sand or gravel, (clamshell buckets): ¾-cu. yd. at 43 ft. radius; 1 cu. yd. at 37 ft. radius; 1¼ cu. yd. at 32 ft. radius. Boom lengths to suit conditions 4-cyl. 5¾x7 in. gasoline engine, 925 R. P. M.

Write for Bulletin 52

A 2689-VII



You Will Always Find the Bucyrus Where the Digging Is Hardest

Where the wracks and strains are the worst—Where the heaviest pounding goes on—The experienced operator noses in his Bucyrus; He does so because he knows he can bank on its absolute dependability under the most severe conditions.

Bucyrus Electric Railroad-Type Shovels, mounted on caterpillar traction, have proven themselves the most practical equipment for loading rock.

Let Us Tell You Why.

Ask for Bulletin A-1-A

BUCYRUS

Established in 1880.

Railroad Type and Revolving Shovels of All Sizes, Dragline Excavators, Trench Excavators, Dipper, Hydraulic and Placer Dredges, Spreader Plows, Wrecking Cranes, Etc.

BUCYRUS COMPANY, South Milwaukee, Wis.

New York Chicago Birmingham San Francisco Portland Denver
Tokyo London

A Special Plant at Evansville, Indiana, Devoted Exclusively to Small Revolving Shovels.

643

Taylor-Wharton Iron & Steel Co.

Wm. Wharton, Jr., & Co., Inc.

Tioga Steel & Iron Co.
Philadelphia Roll & Mach. Co.

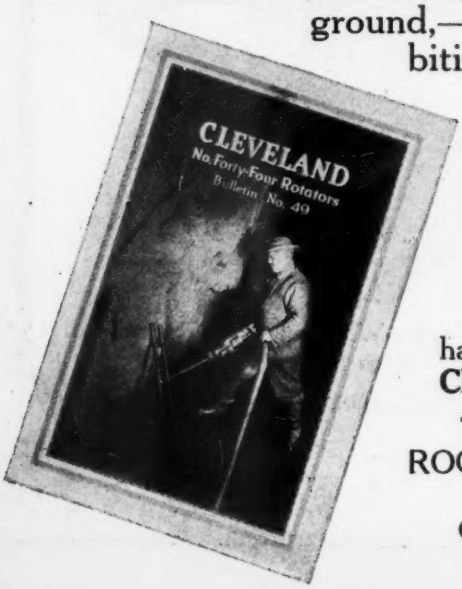
TISCO

One piece dipper of TISCO manganese steel with renewable lip, and Van-Port reversible teeth.

Taylor-Wharton Iron & Steel Co.
High Bridge, New Jersey

A TOUGH DRILLING JOB AND THE CLEVELAND FORTY-FOUR!

An overburden of wet, sticky, clay,—hard rock underneath,—cracks, fissures, shattered ground,—and with it all the biting cold of a Northern winter. A tough job made easy by equipping good men with good drills.



Bulletin 49 tells you all about the hard-hitting, easy-holding **Cleveland Forty-Four.**

THE CLEVELAND
ROCK DRILL COMPANY
3734 East 78th St.
CLEVELAND, OHIO

Why risk blasting success?

OU have too much at stake in your investment for labor and explosives to risk the failure of complete detonation. The only way to be sure is to use du Pont accessories—*always.*

Du Pont Blasting Accessories are absolutely dependable. They have been developed by explosives experts having had extensive and practical experience in the detonation of explosives. Every stage of their production receives the most rigid inspection thereby insuring dependability and efficiency of performance. When ordering your du Pont explosives, include du Pont Blasting Accessories such as:

Blasting Caps
Delay Electric Blasting Caps
Blasting Machines
Galvanometers
Leading Wire
Electric Blasting Caps
Fuse
Delay Electric Igniters
Rheostats
Cap Crimpers
Tamping Bags

Du Pont chemical engineers insure uniformity of quality by chemical control through every step of manufacture from raw material to finished product.

It pays to use du Pont Blasting Accessories. They're *sure* fire *every* time.

Write for Blasting Accessories Catalog containing descriptions and illustrations of du Pont accessories and practical information about their use.

E. I. DU PONT DE NEMOURS & CO., Inc.
Explosives Department
WILMINGTON, DELAWARE

Branch Offices

Birmingham, Ala.	Huntington, W. Va.	Portland, Ore.
Boston, Mass.	Joplin, Mo.	St. Louis, Mo.
Buffalo, N. Y.	Kansas City, Mo.	San Francisco, Calif.
Chicago, Ill.	Mexico City, Mex.	Scranton, Pa.
Denver, Colo.	Miami, Fla.	Seattle, Wash.
Duluth, Minn.	New York, N. Y.	Spokane, Wash.
El Paso, Tex.	Pittsburgh, Pa.	Springfield, Ill.

Du Pont Products Exhibit, Atlantic City, N. J.

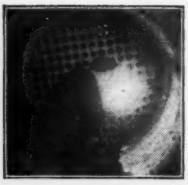
DU PONT

POWDER MAKERS SINCE 1802

Hard work—but important

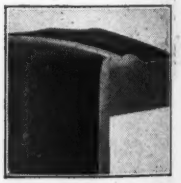
Marion mechanic preparing boiler tubes for electric welding. The tubes are first inserted in the openings, beaded over and calked. Then they are finally and effectively sealed by being electrically welded to the sheet.

An extra operation but it produces a tight, leakless joint that stands up under hard service



The small black speck in center of bright area is point of contact between electrode and tube sheet

Section of tube electrically welded to sheet. Note fusion of the two parts into a tight, leakless joint



The Marion Steam Shovel Company · Marion, Ohio
Established 1884

There are one hundred and twelve seamless tubes in the smallest Marion boiler. Money could be saved by sealing them in the ordinary way. But Marion believes in building the best, hence every tube in our vertical boilers is electrically welded.

2465

Marion Power Shovels

The Model 37 in use on Catalina Island.

RAPID

RELIABLE

ECONOMICAL

Throughout the country Waugh Rock Drills are well known to quarrymen.

Correct design and rugged construction mean high drilling speed, reliability, and low maintenance costs.

The Waugh line includes hammer drills of all types from the 41-pound Model 90 hand auger to the 225-pound Model 34 tunnelling machine.

Model 37
Turbo Waughammer

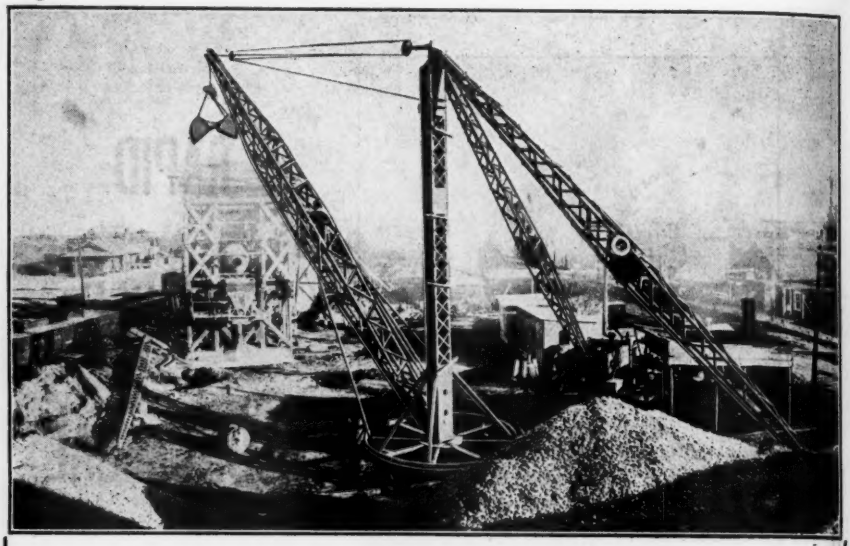
THE DENVER ROCK DRILL MANUFACTURING COMPANY

DENVER COLORADO

New York, Pittsburgh, Scranton, Pottsville, Mexico City
Chicago, Duluth, Houghton, Knoxville, Santiago
St. Louis, El Paso, Birmingham, Joplin, Lima
San Francisco, Seattle, Salt Lake, Butte, Wallace, Los Angeles

ROCK WAUGH DRILLS

Canadian Rock Drill Company, Limited, Sole Agents in Canada
Montreal, Quebec Cobalt, Ont. Nelson, B. C. Vancouver, B. C.
The Denver Rock Drill & Machinery Company, Limited
Sole Agents in South Africa and Rhodesia
Southern Life Building, Johannesburgh, Transvaal, S. Africa
Andrews & George Company, Sole Agents in Japan, Tokio, Japan
Allied Engineering, Limited, Melbourne, Australia



Ten Ton Steel Derrick for Handling Crushed Rock and Sand

The Ten Ton Steel Stiffleg Derrick shown above is used by the McCree Company to handle sand and crushed rock with a two yard clamshell bucket. It has a 90-foot boom and a 40-foot mast and possesses the qualities of speed and ruggedness to a high degree. For over two months this derrick worked 20 hours out of 24 with no serious delays due to breakdowns. With "AMERICAN" 7x10 Three Drum Hoist, and an "AMERICAN" Independent Slewing Engine to swing the boom no more efficient and economical aggregate handler could be devised.

However, if your requirements do not call for such a large capacity machine don't forget that there is an "AMERICAN" Derrick suited to your work whether you have large or small daily yardage to handle.

AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minn.
New York, Chicago, Pittsburgh, Seattle, New Orleans

The O-S Type "T" ¾Yd. Gas Shovel

Sound principles of construction and unrivaled records of dependability that have made O-S Cranes famous, are to be found in the ORTON & STEINBRENNER Power Shovels.

Glance at the illustration above. Note the ruggedness of that gasoline shovel; the correct design; the powerful appearance; the wide Flexible Tread.

The Crowding mechanism of the O-S gasoline shovel is connected directly to the main motor by the use of a shaft and gear drive. No chains or ropes are used. The crowding device is controlled by the operator through friction clutches—absolutely the last word in shovel construction.

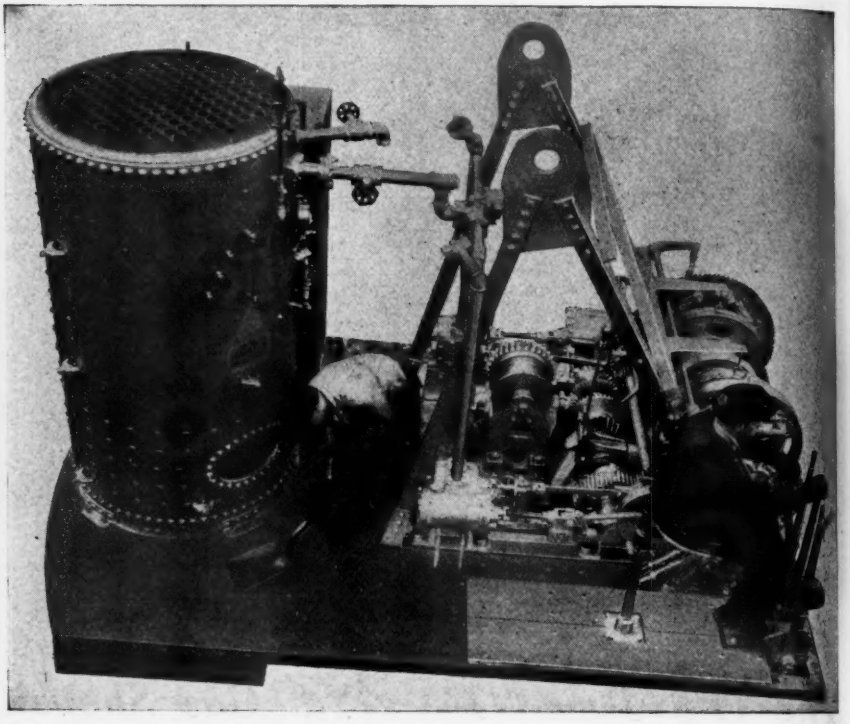
The Power Shovel is fairly a new member of the O-S line of dependable equipment. Our twenty-five years of crane building experience has taught us what a power shovel should be, and we have made it so.

O-S
Locomotive Cranes
Flexible Tread Cranes
Clamshell Buckets
Orange Peel Buckets
Truck Cranes
Gantry Cranes
Power Shovels
Coal Crushers

Catalogs and Specifications Will Be Forwarded On Request

ORTON & STEINBRENNER CO.

608 So. Dearborn Street
CHICAGO, ILL.



Built For Accessibility

HERE is the turntable of the McMyler-Interstate No. 2 Steam Shovel. Note the amount of space available for the operator and fireman. Notice too, that this space has not been gained by crowding the mechanism. Main engine, swing engine and power drums are all accessible. Adjustment and lubrication can be accomplished easily. Practically any shaft can be removed without disturbing the shaft next to it.

Careful design by engineers of 40 years experience in building material-handling equipment and the suggestions of practical shovel runners have produced the No. 2—the most modern and most powerful ⅞-yard shovel built.

May we send you a copy of Bulletin 68? It contains a complete description.

C-2-72

Locomotive Cranes • Power Shovels • Clam-shell Buckets • Pile Drivers

McMyler-Interstate

THE McMYLER-INTERSTATE CO., Cleveland

New York Philadelphia Buffalo Pittsburgh Detroit Chicago San Francisco

The 3/4–7/8 Range

Modern Massillon Steam Shovel

Built to Meet Your Demand for Efficient Shovel Service

A DIGGING DEMON

Combining power, strength, speed, mobility, and accessibility to the highest degree that expert engineering knowledge can give, you will find the Modern Massillon a versatile, hard digging shovel, capable of ripping big loads out of the hardest formations.

It is equally efficient with clam shell, as part of drag line equipment, or as locomotive crane.

Write for complete details

BUILT BY

THE RUSSELL & CO.

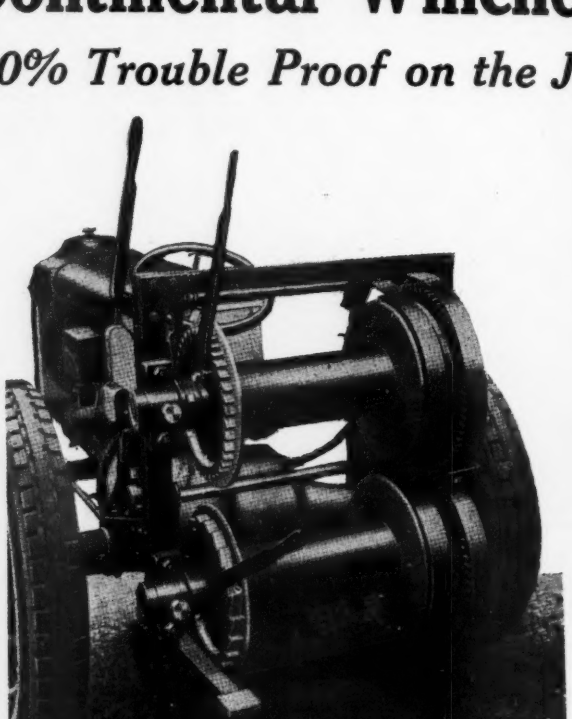
MASSILLON, O.

(Established 1842)

"The Common

Continental Winches

100% Trouble Proof on the Job



THE CONTINENTAL DOUBLE DRUM FRICTION DRIVE WINCH

TWO TYPES—THREE WINCHES

FRICTION DRIVE—GEAR DRIVE—SINGLE DRUM—DOUBLE DRUM

THE friction type is used on construction jobs, such as pile driving, elevating building materials and bailing wells, etc. This type is also used extensively for loading logs, heavy timbers, and in fact, all heavy objects that require careful handling or speedy operation. **Especially adapted for dragline scrapers.**

Sense Winch"

The powerful brakes which control the drums on all CONTINENTAL WINCHES are operated with convenient foot levers, with the exception of the top drum on the double drum type, which is operated by a hand lever.

Each drum is equipped with a ratchet and pawl, so that the load may be held in suspension without the use of the brake. All shaft bearings are babbited and equipped with Alemite fittings.

On the new CONTINENTAL WINCH only CUT STEEL GEARS are used, and with ordinary care and precaution will last indefinitely.

SPEED OF DRUMS AND LINE

The ratio of all drum speeds to the motor of the tractor is 1 to 15, with standard sprockets. Higher speed sprockets can be supplied when necessary. The standard sprockets give all drums on all CONTINENTAL WINCHES a speed of from 25 to 100 R. P. M. with a corresponding motor crankshaft speed of 375 to 1000 R. P. M., thus giving a speed on all lines, ranging approximately from 40 to 200 feet per minute.

CAPACITY OF DRUMS

All drums, both on sliding gear and friction drive types, will spool the following amounts of cable: 6,500 feet of ¼-inch wire cable; 4,000 feet of ⅜-inch wire cable or 2,000 feet of ½-inch wire cable; amounts of other sizes of cable in proportion.

POWER

The CONTINENTAL WINCHES have a pulling capacity of 6 tons on a direct pull at a line speed of 60 feet per minute. By using a series of blocks and tackle, the pulling capacity can be increased several times. With a motor speed of 1,000 R. P. M. and a load of 3,300 pounds, a speed of 200 feet per minute on the line can be had; other speed and loads in proportion.

WARRANTY

Every CONTINENTAL WINCH is unconditionally guaranteed against defective workmanship and material, if reported to us within ninety (90) days after delivery, and all defective parts, if any, will be replaced F. O. B. Memphis, without charge.

NOTE

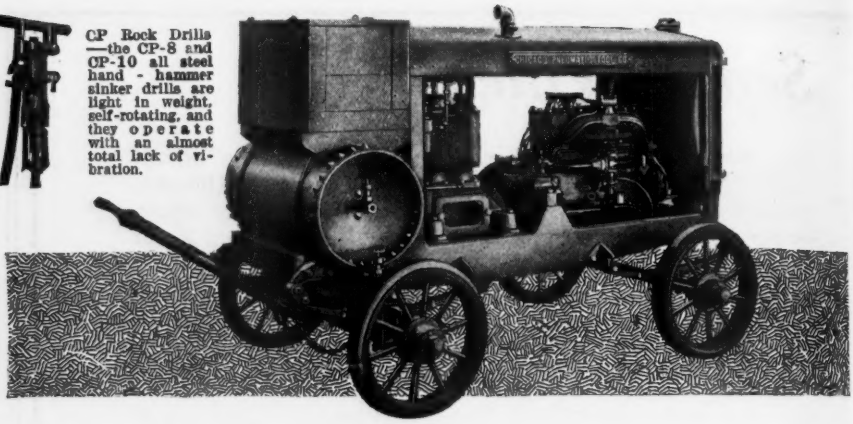
ANY CONTINENTAL WINCH, whether single or double drum, friction or sliding gear type, may be used with rubber tired or regular FORDSON AGRICULTURAL WHEELS.

See your nearest Ford dealer or write us direct

SPINKS SUPPLY CO.

MEMPHIS, TENN.

CP Rock Drills —the CP-8 and CP-10 all steel hand - hammer sinker drills are light in weight, self-rotating, and they operate with an almost total lack of vibration.



CP Air Equipped
means well equipped

Utilization of the highest type of apparatus is the shortest and most economical road to highway work quickly and efficiently completed.

Chicago Pneumatic portable compressors are made in capacities ranging from 100 to 300 cu. ft. free air displacement per minute. They are built in gasoline or electric motor driven types mounted upon steel or rubber-tired wheels, CP trailers, motor trucks or skids.

All sizes of portable compressors are directly connected to the engines or motor—no gears or belts are used. They are provided with automatic speed and pressure governor and the unequaled Simplate Valves—an exclusive feature of all CP Compressors.

For complete information on CP Compressors, rock drills, hammer drills, pavement breakers or any pneumatic tool—write for Bulletins. And—CP Bulletins are convenient and handy references.

Chicago Pneumatic Tool Company
6 East 44th Street, NEW YORK, N. Y.

*Sales and *Service Branches all over the World*

*Birmingham	Houston	*San Francisco	Dairen	*Mexico City	*Rotterdam
*Boston	*Los Angeles	*Seattle	*Durban	*Milan	Santiago
*Chicago	*Minneapolis	*St. Louis	*Havana	Moncton	*Sao Paulo
*Cincinnati	*New Orleans	Tulsa	Helsingfors	*Montevideo	Seoul
*Cleveland	*New York	*Berlin	Honolulu	*Montreal	Tampico
Dallas	*Philadelphia	*Bombay	*Johannesburg	Osaka	Timmins
Denver	*Pittsburgh	*Brussels	Kobe	Oslo	Tokyo
*Detroit	Richmond	*Buenos Aires	*London	Paris	*Toronto
El Paso	Salt Lake City	Calcutta	Manila	Rio de Janeiro	*Vancouver
					*Winnipeg

Canadian Pneumatic Tool Company, Ltd., Montreal, manufacturers of Chicago Pneumatic products in Canada
Consolidated Pneumatic Tool Company, Ltd., London, manufacturers of Chicago Pneumatic products in England

J-180

BOYER PNEUMATIC HAMMERS··LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS··VACUUM PUMPS··PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES ROCK DRILLS·· COAL DRILLS

CHICAGO *Depend upon* **PNEUMATIC** *that name*

The Authority that Settled an Argument

On our desk are four or five hundred letters from superintendents, managers, presidents and other executives of plants telling of various ways in which the Hand Book has proved of assistance to them.

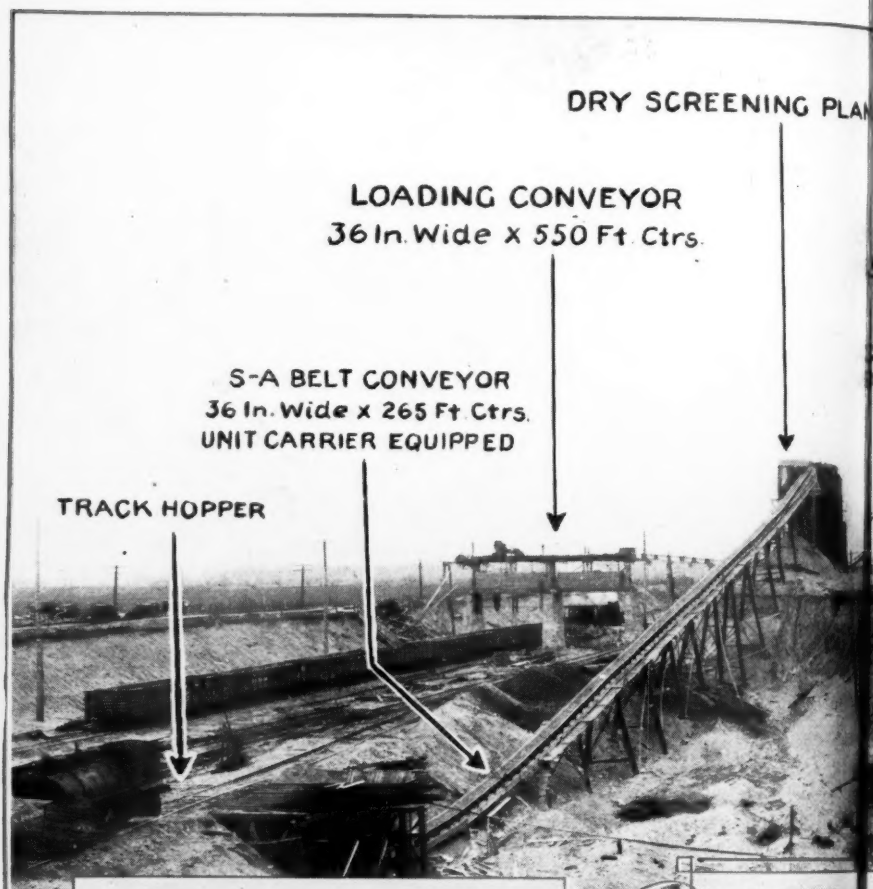
It remained, however, for C. F. Pratt, President of the Pratt Building Material Company, to tell us how the Hand Book settled an argument. Mr. Pratt says:

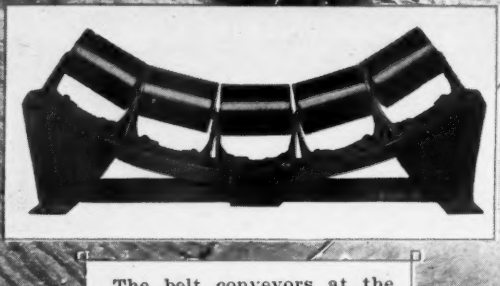
"On a recent visit to our large rock plant at Prattrock, near Folsom, California, a discussion took place, and I noticed that our superintendent referred to Pit and Quarry Hand Book to settle the argument."

By referring to the Hand Book you, too, will find information of great value, not only in settling arguments, but also in answering problems of operation and obtaining data on equipment.

Pit and Quarry HAND BOOK

Rand McNally Bldg. **Chicago, Ill.**





The belt conveyors at the Oxford plant are equipped with the extra heavy Triple-X type ball bearing carriers. Designed by S-A Engineers for Severe Duty.

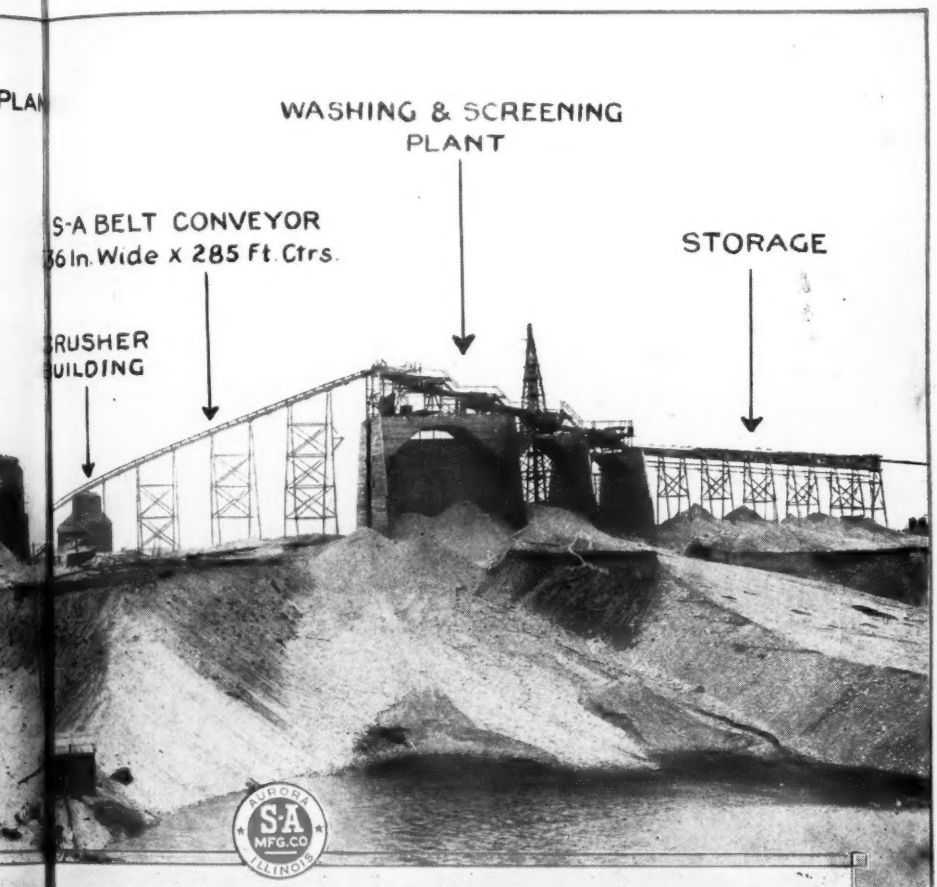
Unite and

This view is ta of the main track hop t convey is 36 inches wid centers the Gradual Tr e space covered conve the equ handles sand a h occas conveyor by tw ch spe The dry screen omprises

To the right a lt conv screening plant extrem

Washed and si is recla belt is 36 inche 50 ft. ce discharging ma the belt

STEPHENS ADAMSON G.



Unite and Supply Co., Pit No. 5, Oxford, Michigan

w is t of the many plants of the United Fuel & Supply Co. looking north showing ck hop conveyor. The belt conveyor from the track hopper to the dry screening plant hes wid centers and is equipped with S-A style No. 101-X Unit Ball Bearing Carriers of lual Tr pe spaced at 2 ft. centers. This conveyor is furnished with S-A special rubber convey the equipment also includes an automatic take-up mechanism. The conveyor sand a h occasional pieces up to 15 inches in diameter. The material is fed to this r by tw ch special belt type feeders. The speed of the conveyor is 400 ft. per minute. screen omprises two S-A style No. 10 extra heavy revolving screens.

right a lt conveyor 285 ft. centers carries the crushed material to a washing and g plant extreme right is shown a surplus storage installation.

and sl is reclaimed with an underground conveyor operating in a tunnel, and this 36 inche 50 ft. centers. In the illustration this conveyor is shown with a tripper for ging ma the belt conveyor to waiting railroad cars below the trestle.

ON G. CO., AURORA, ILLINOIS.

Vulcan
GASOLINE LOCOMOTIVES

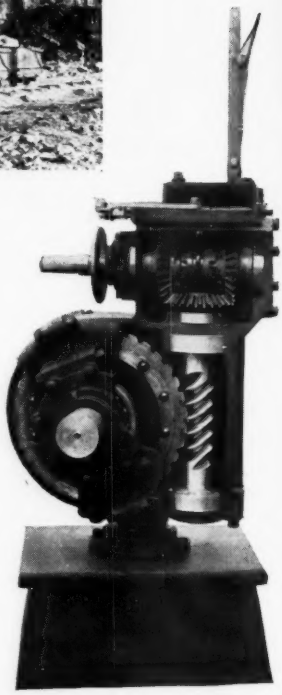
Why a Vulcan easily takes the grades

First, Vulcan Gasoline Locomotives are made for service. They have oversize capacity, strength and durability.

The big feature, however, behind the great pulling ability of Vulcan Locomotives is the worm gear drive—the driving principle long recognized as best by manufacturers of heavy duty motor vehicles.

Eliminating much of the troubles that formerly cut down gasoline locomtive efficiency, Vulcan Worm Drive Gasoline Locomotives will give you real and economical service.

Wouldn't you like to know what Vulcans are doing in other plants? We will be glad to send you this information. Write today.

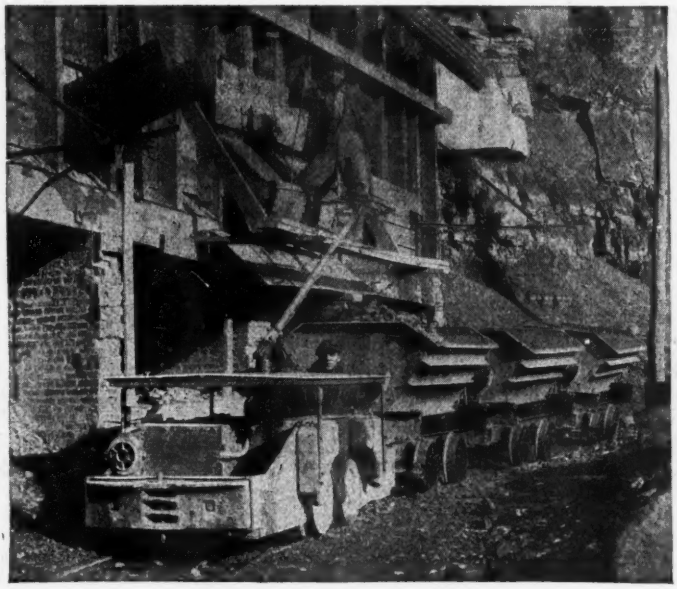


Patents Pending

VULCAN IRON WORKS
WILKES-BARRE, PENNA.

Builders also of The Incomparable Vulcan Steam Locomotive

New York Office 50 Church Street
St. Louis Office 1009 Federal Reserve Bank Bldg.
Chicago Office 913 McCormick Bldg.



Dependable—

ZERO WEATHER means nothing in the operation of an electric locomotive, which is just as dependable and just as ready-every-minute in winter as in summer.

It seldom needs repairs. The record at a quarry in Illinois is that not a cent was spent for repairs in three years.

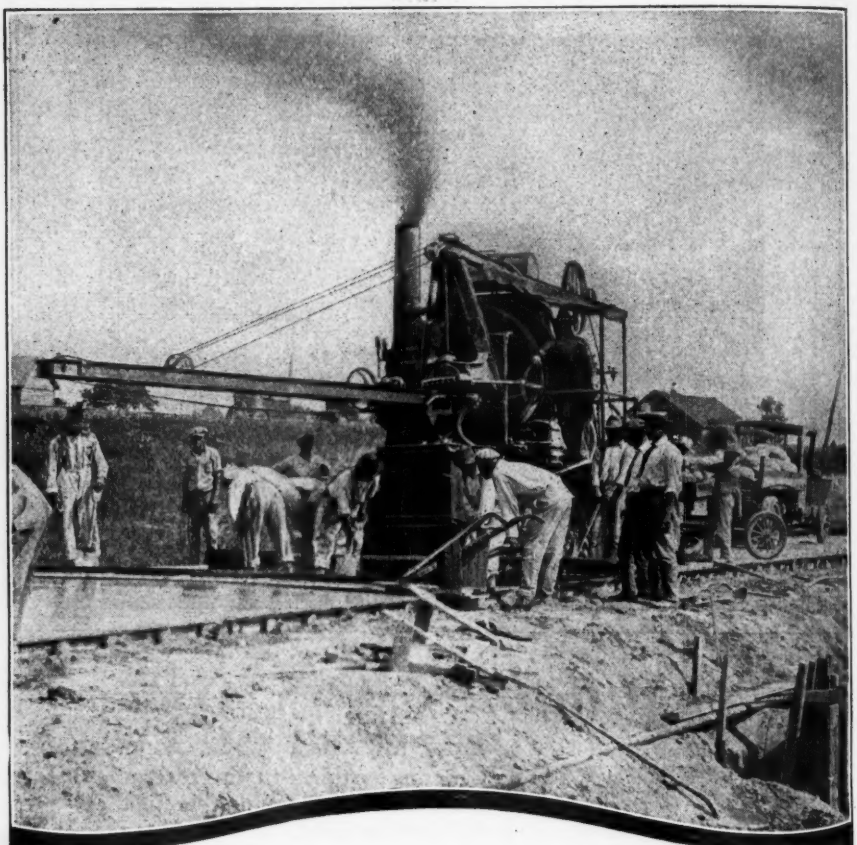
An electric locomotive does its work cheerfully all day—and all night too, if necessary—no matter what the job or the kind of weather. And it's still young when it's ten years old.

Those who have them say the electric locomotives are the most dependable items of their plant equipment.

(85)

GOODMAN MANUFACTURING COMPANY

CHICAGO, ILL.



Many Manufacturers of Road Building and Pit and Quarry Machinery Use as Standard Equipment

WILLIAMSPORT WIRE ROPE

Patented Telfax Tape Marked

Whenever you find a manufacturer using Williamsport Wire Rope as standard equipment, you may feel confident he is anxious to give you the best equipment money can buy.

This manufacturer can buy many ropes for less money—but he wants to have the best wire rope and to know you are getting it.

The "TELFAX" certified tape protects both maker and user in this.

Send for our latest catalog just off the press.

WILLIAMSPORT WIRE ROPE CO.

Main Office and Works:
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General Sales Office:
Peoples Gas Bldg., Chicago

Guarantee

Owen Buckets, properly installed and operated, are guaranteed to do a bigger day's work than any other bucket of the same weight and capacity—

—or—

Write your own guarantee!

OWEN BUCKET CO.

A Mouthful at Every Bite

Action—lightning-like in its speed—characterizes the wolf. Action, quite relative to be sure, characterizes Owen Buckets.

This bucket is so designed that the action can be controlled for different materials, rendering its maximum effectiveness on every job.

What will an Owen Bucket do for you?

For one thing, it will take a bigger load at every grab.

It will handle faster and take more loads in a day.

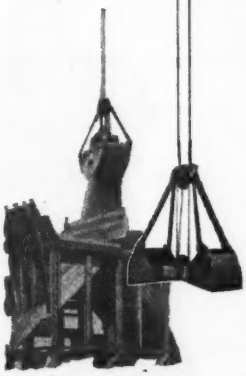
It will cut down repair bills because it is built to stand the most severe strains.

It will render more working hours in a life time.

All in all, it will save money and make money for you.

We know these facts to be true and can prove them to you. Will you let us?

Send for folder 1-A which makes these statements self-evident.



1 yard Type "J" Bucket owned by the Fairlawn Supply and Coal Co., Fairlawn, Ohio, and used for handling 2½" crushed stone. Crushed stone is one of the hardest materials to handle and an Owen Bucket was chosen after two other makes had failed.

THE OWEN BUCKET COMPANY
406 ROCKEFELLER BUILDING CLEVELAND, OHIO

OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAY'S WORK

Owen Buckets

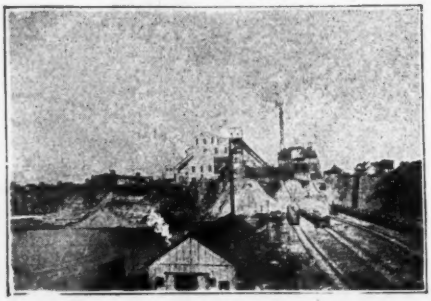
INSURE A BIGGER DAY'S WORK

© O. B. Co.

COMPLETE EQUIPMENT

—for—

CRUSHING PLANTS



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Complete Plans Made by Competent Engineers Let Them Solve Your Problems

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Undivided responsibility. Your safeguard.

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Competent erecting engineers at your SERVICE

OFFICES IN ALL PRINCIPAL CITIES

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

TELSMITH AND THE TRAMP IRON PROBLEM!!!

The pictures are from snapshots taken at Markgraf's quarry, Joliet, Ill. Mr. Markgraf says, "Tramp iron goes through the Telsmith Crushers without doing any damage."

Now, no crusher can long escape trial by tramp iron. Bolts, drill points, hammer heads, all small pieces of steel, are dangerous. They sometimes elude even the mechanical vigilance of a magnetic separator. When the crisis comes, it's comfortable to own a Telsmith Crusher, backed by Telsmith's Guarantee against breakage by tramp iron. It is the broadest warranty ever made by any crusher manufacturer.

You want a crusher that *stands up* when others break—one that keeps on working when the unexpected happens—a machine that defies tramp iron. We know of no better way to *prove* Telsmith's outstanding ability than by Telsmith's Guarantee. It means more than a bushel of crusher literature. We leave the glowing descriptions and the thrilling superlatives to others. Read Telsmith's Guarantee and draw your own conclusions. If you want more evidence, write the Markgraf Stone Co., at Joliet.

Glad to send you without obligation, Catalog No. 161 (Telsmith Primary Breaker) and Bulletin No. 2-F-15 (Telsmith Reduction Crusher).

SMITH ENGINEERING WORKS

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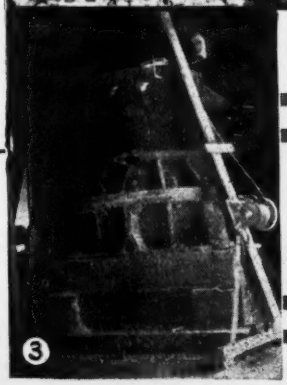

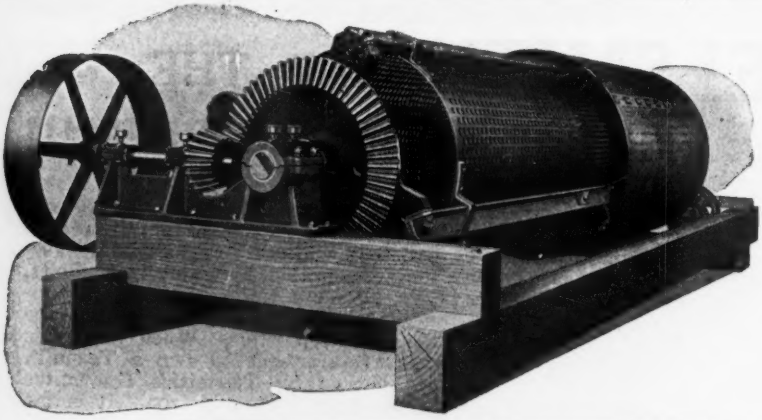

TOEPFER

Meeting Strict Specifications

The operator who has to meet strict specifications in road materials is in a pretty howdy do if his screening equipment won't measure up.

When his State's requirements are exacting, calling for the very best quality of product, graded *right*, he can't afford to take any chances as to his screening equipment.

We have many instances on record of men who "took no chances," and installed Toepfer Screens. Result: they made good and came out 'way ahead.

Toepfer equipment is what you want, because *it passes the most severe tests.* You will be interested in our catalogue. Send for it.

REVOLVING SCREENS
SCRUBBERS
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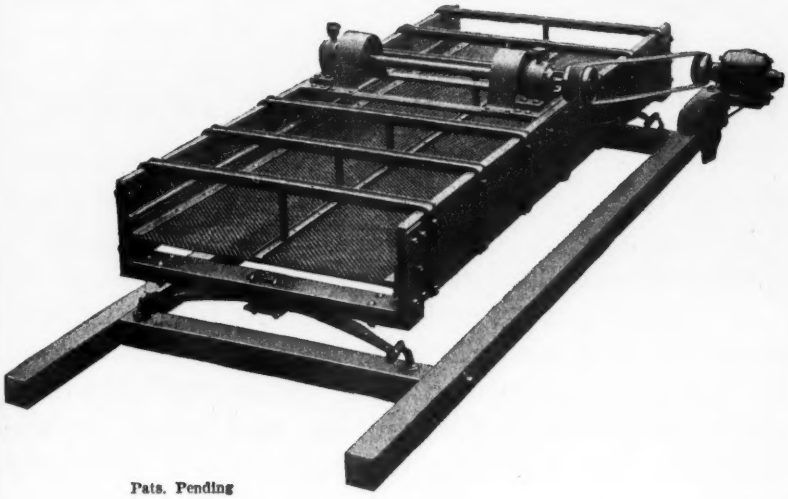
UNIVERSAL VIBRATORS

are giving

UNIVERSAL SATISFACTION



Pats. Pending

READ: What Mr. K. E. Casparis, General Manager of the Casparis-Ohio Quarries Company, has to say about the service that their UNIVERSAL VIBRATORS are giving.

"Our company has installed your screens and from my experience with them during the past season I believe you have the BEST vibrating screen on the market today and I have tried them all at one time or another. For simplicity and action, lightness and easy upkeep they can't be beat."

Catalog No. 50 contains complete information.

May we send you a copy?

UNIVERSAL VIBRATING SCREEN CO.

RACINE ~ ~ WISCONSIN

See P&Q HAND BOOK *Page* 426

Salem Steel

Style "AA" Malleable Iron

What Material Are You Handling?

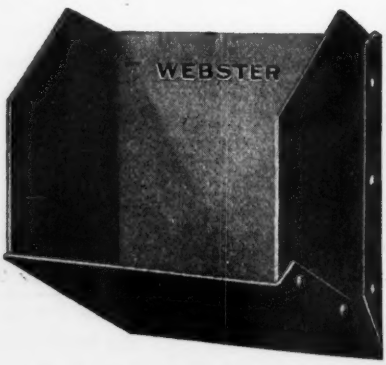
If it is sand, lime, gravel, cement, coal, ashes, ore, crushed stone, phosphates or any other gritty or abrasive material, there is a Webster elevator bucket for the job.

These buckets are made of the highest grade material and are properly designed. They load to rated capacities and discharge cleanly. Among the many varieties and sizes in the Webster line there is a bucket which precisely fits your needs.

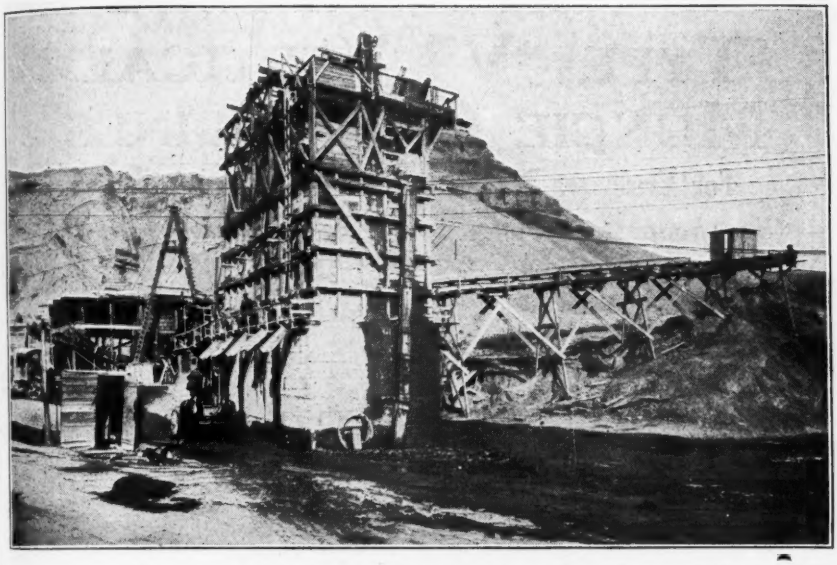
When you need buckets, chain, sprocket wheels or complete elevators and conveyors, it will pay you to get in touch with us.

THE WEBSTER MFG. COMPANY
4500-4560 Cortland Street
CHICAGO

Style No. 1 Steel Continuous



Style No. 5 Steel Continuous



Sand and Gravel Plant, designed, built and installed for Albany Gravel Company, Albany, N. Y. Capacity 400 yards per day.

The Measure of Plant Efficiency

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Proper Design. Dependable Machinery. Service

The measure of the efficiency of any plant is determined by the way in which the different departments co-ordinate, the manner in which the equipment performs under all conditions, and the service behind the plant.

All plants furnished by us have all three of the above named factors. Our Engineering Department has years of practical experience behind it. Our machinery has a country-wide reputation for durability and efficiency. Through our big organization of engineers, expert mechanics and salesmen, and because of our numerous distributing warehouses, we are able to furnish service that is of untold value to plant operators.

If you are considering the installation of a new sand and gravel or crushing plant, or if you expect to change or enlarge your present plant, we are at your service. Consult us by letter, wire, 'phone, or in person, without obligation.

Write today for Crushing Machinery Catalogue K. A. U., or Sand and Gravel Machinery Catalogue 5-A. Either will interest you and will be furnished without obligation.

THE GOOD ROADS MACHINERY CO., Inc.

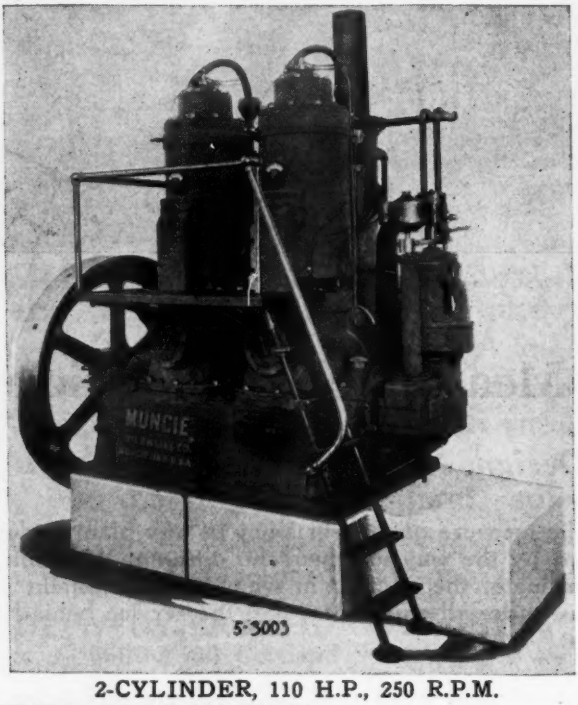
KENNETT SQUARE, PA.

49TH AND HALSTED STS., CHICAGO, ILL.

TYPE "V" VERTICAL MUNCIE OIL ENGINES

For Crushers, Draglines, Dredges, Pumping, Etc.

Use cheapest fuel oils, and give greatest reliability at lowest all around cost.



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DRY TYPE COMBUSTION
HIGH COMPRESSION
SOLID INJECTION
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HEAVILY PROPORTIONED THROUGHOUT,
OPERATIVE CONTROL FROM ONE POINT

SIZES TO SUIT ANY REQUIREMENT FROM 25 to 330 B.H.P.

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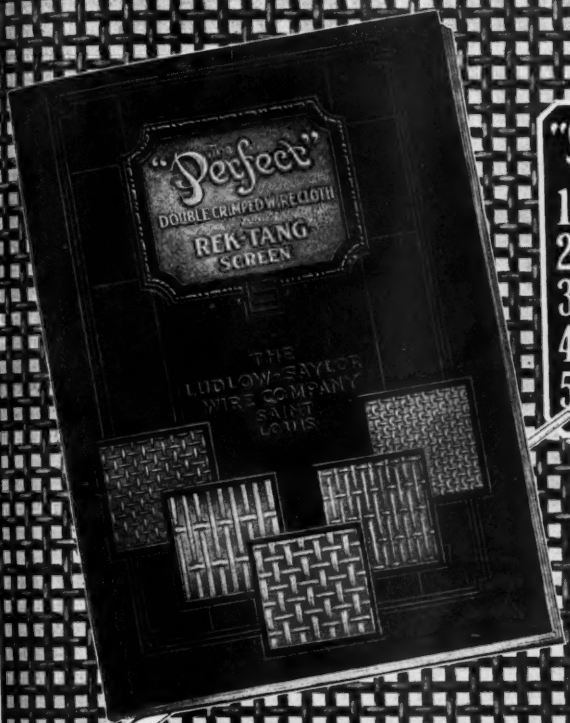
724 POWERS AVENUE **MUNCIE, INDIANA**



"Perfect" Service

1. Most **COMPLETE** wire cloth **SERVICE**
2. Most **ACCESSIBLE** wire cloth **SERVICE**
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LUDLOW - SAYLOR WIRE CLOTH, properly selected and applied to your equipment, will **screen more feed, take out more fines,** and **raise the average effectiveness of every subsequent process.**

Our new Catalogue No. 47-E4 is a Text-Book on Screens.

Get your copy from the first edition.

MEMO

The Ludlow-Saylor Wire Co., 610 So. Newstead Av., St. Louis.

Send us one copy of Catalogue No. 47-E4 which lists The Thousand "Perfect" Woven Screens.

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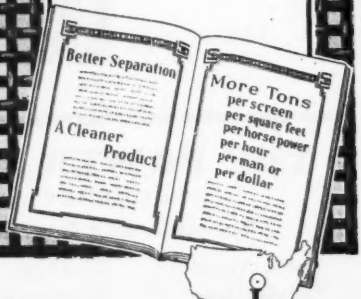
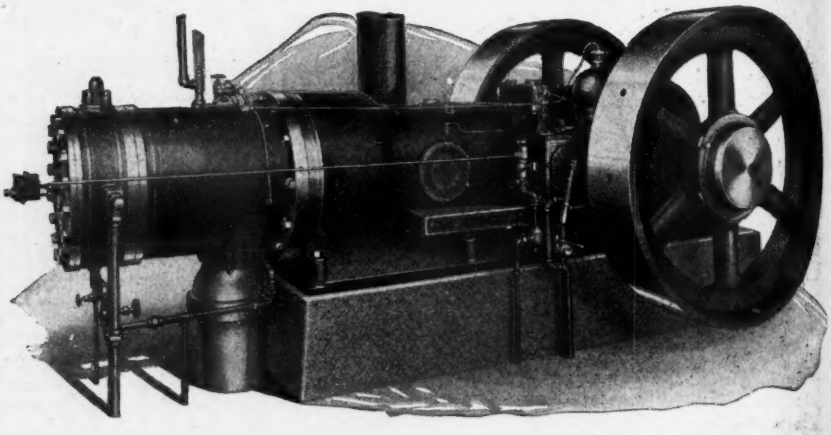


"The city surrounded by the United States"

The LUDLOW-SAYLOR WIRE COMPANY St. Louis

PRIMM POWER

Makes Greatest Production Possible



SAND — GRAVEL — CRUSHED STONE

A PRIMM Oil Engine will supply dependable economical power in the production of building, moulding and glass sand as well as gravel and crushed stone. PRIMM Power can be relied upon no matter what the load may be. At the limestone, cement rock and granite quarries it has proven its ability to stand up—year in and year out—producing reliable power usually at less than one half the cost of electric or steam power.

It will pay you to investigate PRIMM Oil Engines. They pay for themselves over and over again. No experienced engineers are necessary—any one can operate them.

PRIMM Service is Country wide. Our Engineers will gladly go over your power requirements with you. You will sell yourself on PRIMM Oil Engines once you thoroughly examine them and learn of the results they accomplish. Write us today.

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PRIMM OIL ENGINES

20 H. P. TO 300 H. P.

THE POWER MANUFACTURING CO.

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WESTON DIRECT DRIVE GYRATORY CRUSHER

AN INTERMEDIATE AND FINISHING MACHINE

Direct flexible connection of motor to eccentric permits higher speed of gyration, increasing the capacity of this machine.

All-steel construction with alloy shaft, bronze bushings and positive oil circulation without pump.

Power consumption low.

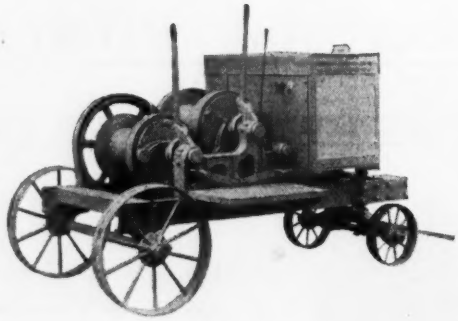
Unit construction permits easy installation and flexible plant conditions.

This machine merits your thorough investigation.

Built in six sizes—direct motor or belt drive.

Send for Bulletin 27

Why buy a lot of cast iron when half of the weight in steel will stand more strain, wear longer and less worry.



Ebel Hoists are built of steel, made portable and light just what you have been looking for. The above cut is our model "BC" will handle a ¾ yd. Bottomless Scraper and weighs but 3500 lbs., no matter what your condition may be we have a hoist for the job either for Drag-line work, running Elevators either single or double cage or for Pile Driving.

Bottomless Power Scrapers for handling sand, gravel or clay also a scraper especially for handling marl with drag-line hoist.

Get in touch with us direct
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Lansing Motor & Pump Co.
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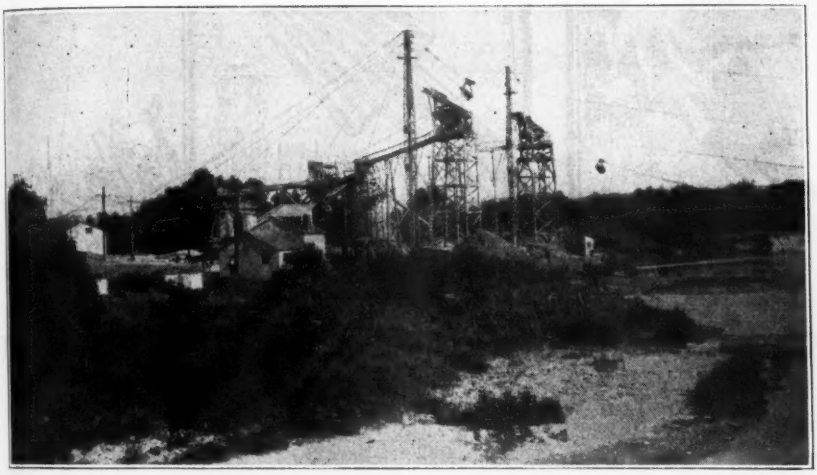
Pioneer
Back-Dump Bucket



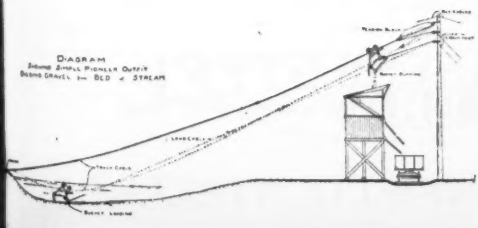
Before placing your order for your gravel handling equipment send for our new Pioneer Catalogue.

PIONEER BUCKET CO.

Successors to

The Mansfield Engineering Co.

Indianapolis



Gentlemen! You've All Met Abrasion

Have You Met His Most Successful Opponent?

You've all met Abrasion, suffered from his handiwork, sustained loss through delay and breakdowns. He exacts toll from every operator. There are operators, however, who have reduced their losses from abrasion to a minimum. They are the men who have replaced worn equipment and made repairs with "ERA" Manganese Steel Parts.

"ERA" Manganese Steel defies abrasion as no other metal can. It stands up under the most terrific service. And, note this, each month's service increases the toughness of "ERA" Manganese Steel so that the wear actually decreases with each succeeding month's service.

Any equipment replacement made with "ERA" Manganese Steel will, through its longer service, save you money. On your replacements of crusher parts, chain, dipper parts, screens, and other pit and quarry equipment, investigate the superiority of "ERA" Manganese Steel repair parts.

Write for catalogue and estimates.

MANGANESE STEEL
ERA
THE FIRST - STILL LEADS IN QUALITY

HADFIELD-PENFIELD STEEL CO.
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AMSCO

Your Own Common Sense Tells You—

Granite Sand and Gravel Company
"BETTER SERVICE"
WASHED AND SCREENED SAND AND GRAVEL
INDIANAPOLIS, INDIANA

February 13, 1925.

American Manganese Steel Co.,
Chicago Heights, Ills.

Attention: Mr. J.T. Capps.

Gentlemen:-

We have your inquiry of February 2nd, relative to our success in using your twelve inch, American Manganese Steel Pump.

We have had no cause to change our estimate of September 1,21 The initial shell on the pump gave us something over a million yards of material. We installed the first new shell in July, 1924, and the pump had been in almost constant operation from the date of its installation.

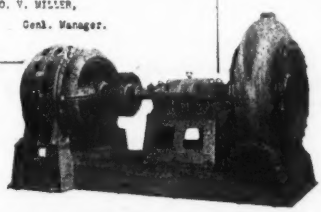
We assure you that when we are in need of castings for repair we will give you the opportunity to furnish them.

Very truly yours,

GRANITE SAND & GRAVEL CO.,

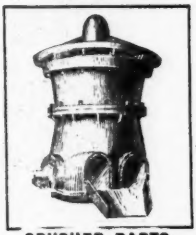
GEO. V. MILLER,
Genl. Manager.

CVM:CH



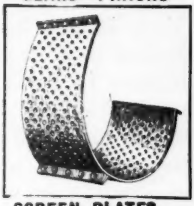
DIPPERS—TEETH

ALL TYPES OF CHAIN AND SPROCKETS



CRUSHER PARTS

GEARS—PINIONS



SCREEN PLATES OF ALL TYPES

that this huge production of a million yards from one Amsco pump shell cannot possibly be a typical case—and you are right. This particular pump is used under unusually favorable operating conditions, but—

If you install an AMSCO Pump under our recommendations, hundreds of successful operations are your assurance of a lower cost per yard of material handled than you can otherwise obtain.

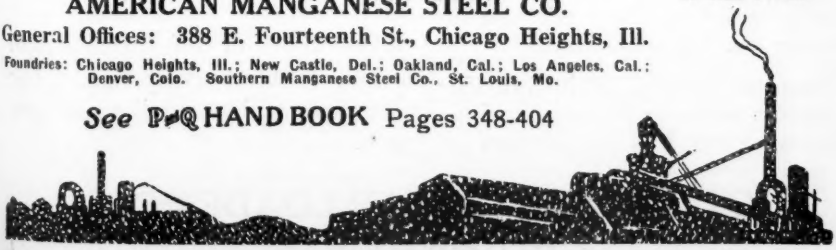
Send for our literature and let us figure with you on your proposed installation.

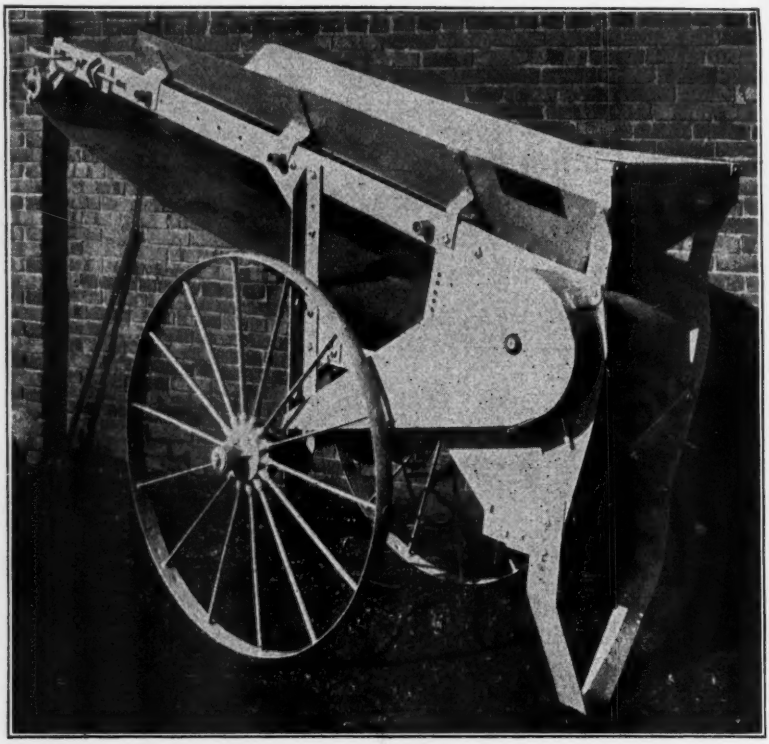
AMERICAN MANGANESE STEEL CO.

General Offices: 388 E. Fourteenth St., Chicago Heights, Ill.

Foundries: Chicago Heights, Ill.; New Castle, Del.; Oakland, Cal.; Los Angeles, Cal.; Denver, Colo. Southern Manganese Steel Co., St. Louis, Mo.

See P&Q HANDBOOK Pages 348-404





A loading gang at the cost of only one man's time

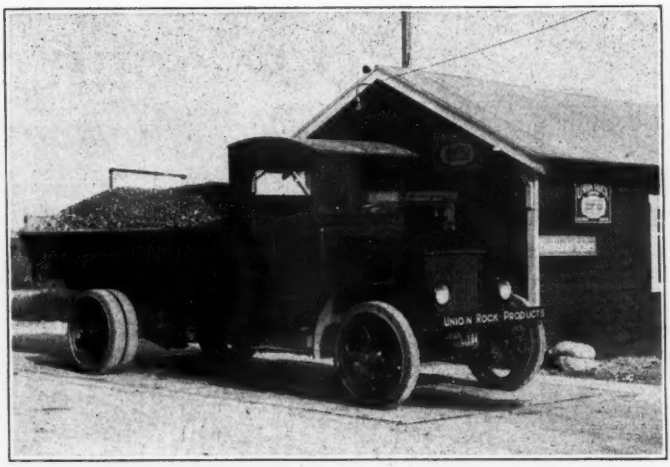
You have, like other operators, found that the increasing cost of human labor is an important factor in the operation of your plant. Offering relief by eliminating the necessity of more than one man in loading or unloading Ottumwa Portable Box Car Loaders reduce costs, speed up the work and increase loading efficiency.

Ottumwa Portable Belt Box Car Loaders embody the most refinements of any box car loaders on the market selling for less then $1,000. It is adjustable and can be obtained with electric or gasoline power. The motor or engine is protected from dust, dirt and grit. Roller and ball bearing throughout, latest improved Alemite Greasing System.

Write for full information and prices without obligation. The Ottumwa will put dollars in your safe.

OTTUMWA BOX CAR LOADER CO.

OTTUMWA, IOWA



The Auto Truck Scale that stays accurate

The only scale that will safeguard you against the heavy losses of inaccurate weighing is the scale that not only is accurate but stays accurate.

There is never any question about the accuracy of the Fairbanks Type "S." The principles of design employed in this scale were first proved in railroad track scale service—the heaviest, most withering service that a scale can be subjected to. Its record of unvarying accuracy in railroad service was again repeated under the trying conditions of large capacity grain hopper scales, and now this firmly established principle is setting new standards of accuracy in the Type "S" Auto Truck Scale.

Still more important, the use of rust-proof moving parts and precision in every construction detail assure absolute accuracy throughout the unequaled life of the scale.

Our representative will be glad to give you facts and figures. Or mail the coupon for the interesting book, "A Talk on Scales."

FAIRBANKS SCALES

Chicago, 900 South Wabash Avenue

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And forty other principal cities, each with a service station

The coupon will bring this booklet full of scale information which every scale owner should have.

(Mail to office most convenient)

Fairbanks Scales, Dept. S-B-3,
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Please send your booklet, "A Talk on Scales," also Type "S" specifications and full information about the economy of Type "S" Scales in weighing motor trucks.

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For the convenience of readers who are in the market for equipment, our "Free Service" department will furnish on request any information, catalogs and prices on any machinery, equipment or supplies used in pits and quarries. The coupon below makes it easy fo you. Simply check, sign and mail.

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- ☐ Bag Filling Machines
- ☐ Bag Sewing Mach.
- ☐ Bags, Cotton
- ☐ Bags, Paper
- ☐ Barges
- ☐ Barrels, Steel
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- ☐ Belting, Conveyor
- ☐ Belting, Transmission
- ☐ Bins, Clay Tile Storage
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- ☐ Bins, Steel Storage
- ☐ Bin Gates
- ☐ Blasting Fuses
- ☐ Blasting Powder
- ☐ Block Machinery, Concrete
- ☐ Boiler Compound
- ☐ Boiler Skimmers
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- ☐ Box Car Loaders
- ☐ Brick Machinery, Concrete
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- ☐ Cranes, Locomotive
- ☐ Cranes, Traction
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- ☐ Crushers, Jaw
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- ☐ Draglines, Revolving Boom
- ☐ Dragline, Scraper
- ☐ Dredges, Dipper
- ☐ Dredges, Land
- ☐ Dredges, Sand Suction
- ☐ Drill Steel
- ☐ Drilling Contractors
- ☐ Drill Sharpening Machines
- ☐ Drills, Blast Hole
- ☐ Drills, Hand Hammer
- ☐ Drills, Tripod
- ☐ Dryers, Sand and Stone
- ☐ Dry Pans
- ☐ Dump Wagons
- ☐ Dust Collecting Systems

(Continued on next page)

Firm Name .....
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- ☐ Dynamite
- ☐ Dynamos, Electric
- ☐ Economizers, Fuel
- ☐ Elevating Equipment
- ☐ Engineering Service
- ☐ Engines, Gasoline
- ☐ Engines, Oil
- ☐ Engines, Power Plant
- ☐ Engines, Steam
- ☐ Feeders
- ☐ Fire Alarms
- ☐ Fire Alarm Systems
- ☐ Fire Brick
- ☐ Frogs and Switches
- ☐ Fuses, Blasting
- ☐ Gas Producers
- ☐ Gears
- ☐ Gear Speed Reducers
- ☐ Generators, Electric
- ☐ Grapple, Stone
- ☐ Grate Bars
- ☐ Grates
- ☐ Gypsum Separators
- ☐ Hoisting Engines
- ☐ Hoists, Chain
- ☐ Hoists, Derrick
- ☐ Hoists, Drum
- ☐ Hose, Sand Suction
- ☐ Hydrators
- ☐ Hydraulic Mining Nozzles
- ☐ Hydraulic Pipe
- ☐ Hydraulic Pumping Engines
- ☐ Hydraulic Valves (Pulpit and Indicator)
- ☐ Idlers, Belt Conveyor
- ☐ Industrial Railway Systems
- ☐ Kettles
- ☐ Kilns, Cement
- ☐ Kilns, Lime
- ☐ Lights, Carbide
- ☐ Loaders, Boom and Bucket
- ☐ Loaders, Conveyor
- ☐ Loaders, Bin, Portable
- ☐ Locomotives, Electric
- ☐ Locomotives, Gasoline
- ☐ Locomotives, Steam
- ☐ Locomotives, Storage Battery
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- ☐ Pipe, Spiral
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- ☐ Post Molds, Concrete
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- ☐ Unloaders, Conveyor
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- ☐ Washing Equipment
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(See other side)

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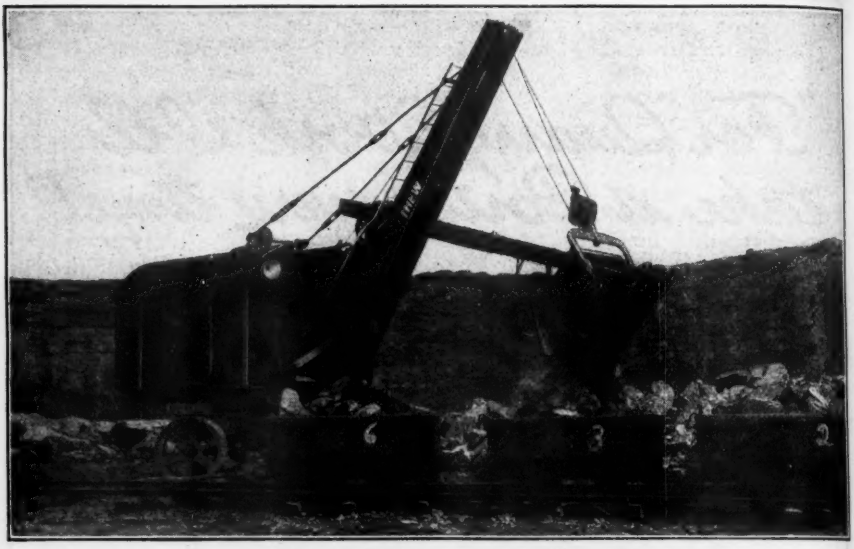

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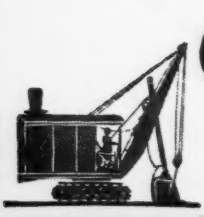

Thew
Power Shovels

Pit and Quarry

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Pit and Quarry

A Semi-Monthly Publication for Producers and Manufacturers of Sand, Gravel, Stone, Cement, Gypsum, Lime and Other Non-Metallic Minerals.

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A Flexible Handling Layout That Holds Down Costs

Many pit owners are finding that a flexible Barber-Greene handling layout, that can be quickly changed to meet changing needs, is often instrumental in holding pit costs to a low level.

Actual digging operations, while perhaps not far away from the washing, screening or loading plant, often move so rapidly that handling equipment cannot keep up with them.

Here is where Barber-Greene Conveyors step in to do their bit in keeping red ink off the books.

Each Barber-Green Portable Conveyor is a separate unit that can be used singly or as one of a series. A layout made up of such machines is exceptionally flexible. It can be arranged and rearranged quickly to meet varying needs. And the cost of changing and rearranging is negligible. In addition, new units can be added, when expansion demands, at an exceptionally nominal cost.

Such a system can follow closely each digging move and can assure a steady supply of material to the screening, washing or loading plant.

The low operating cost of Barber-Greene Conveyors is another reason why they help to keep red ink off the books.

Barber-Greene Conveyors are built on the Warren truss frame. This construction provides the light weight that makes moving easy as well as the strength that assures long trouble-free service.

The conveying belts are supported for their entire length, carrying and return, on alemite-lubricated rollers with dust-proof bearing. Not much chance for wear and trouble at these important points.

We must not forget the Barber-Greene Bucket Loader. More and more of them are being swung into pit loading work, where conditions are such that power shovels and draglines can't pay their way.

The Barber-Greene Catalog N gives a lot of specific dope on Barber-Greene pit equipment. This booklet may be able to show you how you can save money. Since it's free why not write for a copy at once?

BARBER-GREENE COMPANY, 490 W. Park Ave., Aurora, Ill.

Representatives in fifty cities

BARBER GREENE

Portable Belt Conveyors — Self Feeding Bucket Loaders

Automatic Ditch Diggers

Pit and Quarry

Vol. 10 Chicago, Ill., April 1, 1925 No. 1

Choosing Subordinates

REQUISITES of the successful executive have been frequently discussed. They comprise qualities of leadership, foresight and vision without which an executive is unworthy of the name. He must organize his business according to functions; he must specify clearly the scope and duties of each department; he must select men fitted to head each department; and then he must place the responsibility for the operation of each department upon its head. It is a simple formula. The duties are turned over to men qualified to bring about the performance of those duties, men whose success will be judged solely by the results accomplished. It is a simple formula, but it proves to be a baffling problem to many executives. How shall those subordinates be chosen? Where shall I find the right man for the place? Such questions occupy the minds of men who fervently desire to be successful executives.

Choosing subordinates is perhaps the most vital part of the work of the executive. If he is successful in this one particular, his organization is strong. All executives are not natural judges of human nature, nor are they capable of estimating a man's ability. It is the rare executive who can make quick, sure decisions regarding the capability of men. Some executives seem to have a sixth sense for recognizing ability in men, but if that sixth sense is analyzed, it is found to be based on something more than guess work. A mistake in placing control in the hands of a subordinate may be measured in terms of thousands of dollars. Every executive must consider carefully those qualities which are fundamental to successful achievement in his subordinates. Whether selections are made quickly or after long deliberation, they must be made in accordance with certain fundamental principles. As a rule the men who will be most desirable for responsible positions are already somewhere in the organization. The material is at hand if the executive is wise enough to find it. If capable men are not being trained right in the organization, there is something wrong. It is the task of the executive to search for those qualities which are essential in his subordinates.

Leadership is a quality which will fit a man to qualify for promotion. Among any group of men working together there will be found those who follow and the more rare one who leads. The leader is not the one who makes the most noise, nor the one who is most conspicuous; he is the one to whom the others voluntarily turn for suggestions. The leader is pointed out by his fellow workmen, not by himself. "How would you do this?" is the question which indicates where the leader is, rather than the boastful, "This is the way I should do it." Hence an observant executive may easily ascertain where the natural leaders are. If these leaders have other necessary qualities, they are the logical ones to be trusted with responsibility.

A second quality necessary in the man who is to become head of a department is knowledge of the work. The chief executive need not understand all the technique of the business, but he must be wise enough to secure men who do. Each head must be a specialist; he must be an authority. If he is not entirely qualified when he is considered for the place, he may fit himself for the work within a reasonable time. He is to be held responsible for the success of his department and will rise to meet the opportunity that is presented if he is qualified for the place. He must never be caught napping, but must rather keep ahead of the game. If, for example, he is responsible for the shipping, he must keep up-to-date on all transportation problems. The mere loading of trucks or cars is not the scope of his work. No doubt that

work could go on without him. The whole problem of shipping, methods, rates, laws, etc., should be studied so that he can give to his chief executive at any time all information pertaining to his particular business together with changes and developments. That is his job, and for that he has been given responsibility and recognition. He must be informed and up-to-date.

A third quality then will be ambition and will be inseparably linked with this necessity of knowledge. The man with ambition will become an authority in his field. If he is in charge of blasting, it will be his ambition to secure all available information on that subject. Methods, costs, materials, experiences of others, are all of value to him. A desire to achieve maximum success for his company will prevent his ever becoming satisfied that he has reached perfection. The man of ambition has a goal ahead which he constantly approaches but never reaches.

Enthusiasm is a quality which is valuable in an organization. Enthusiasm is invariably allied with energy; it is a motive power which brings about achievement. The employee who is enthusiastic is the employee who is devoted to his work. There is no element more destructive to a group than indifference; none more profitable than enthusiasm. It means vigor, virility, and health. It prevents inertness and stagnation. It permeates the entire force and carries others along with it. A chief executive should keep an eye on the man of enthusiasm. If the quality is genuine and fundamental, it is one that may be of great value somewhere in the organization.

None of these qualities of the head of a department is of great value without loyalty. The man who has the welfare of the organization at heart; who believes that the success of the whole is his own personal success; who looks upon the business with a feeling of pride because it is in part his work, is the valuable subordinate. Loyalty can be created and fostered. That is the great task of the successful executive. If he has wisdom, he offers ample opportunity to his men to seek him for counsel and advice; he coordinates all departments so that each one is assured full and unhampered opportunity to fulfill its responsibilities; he wins and retains the loyalty of his men. Such an executive draws to his organization capable men who are a vital part of a business structure that is strong and permanent. In such an organization there come visible results: expansion of business without strain; profit which is inevitable when more brain power, the maker of profits, is applied; and a personnel that is significant of the strength of the chief executive.

An Interesting Decision

SEARCHING through the books of private business concerns by the Federal Trade Commission has been stopped. The Senate recently passed a resolution calling upon the Federal Trade Commission to obtain information as to the causes effecting the lowering of the price of grain. The information was to be used for legislative purposes if possible. The Commission, acting upon this authority, demanded access to the papers and books of Hammond, Snyder and Company, the Baltimore Grain Company, and the H. C. Jones Company. These firms refused to give access to their books. The Federal District Court at Baltimore sustained the companies in their refusal. The Supreme Court has now affirmed the district court's decision.

Congress, in search of information upon which to start legislative action, cannot search into private books and papers of private business concerns. Such a search cannot be conducted by Congress, either house, or by any congressional committee, or by either or both houses acting through the Federal Trade Commission unless a specific charge of violation of the law is made.

The Supreme Court has not yet decided what rights Congress has as to a search should a specific charge be made. The court may hold, should a case arise, that when a specific charge is made, specific documents may be subpoenaed. A searching expedition, however, will not be permitted.

The Federal Trade Commission, like the Interstate Commerce Commission, is the result of an evolutionary process justified by the law of necessity in our national growth, and is a valuable and wholesome agency when functioning within constitutional boundaries.

Stringtown Crushed Rock Company Operating in Oklahoma

Modern Plant Producing 1,600 Tons Daily at Stringtown Night Operation Has Proven Successful at This Plant

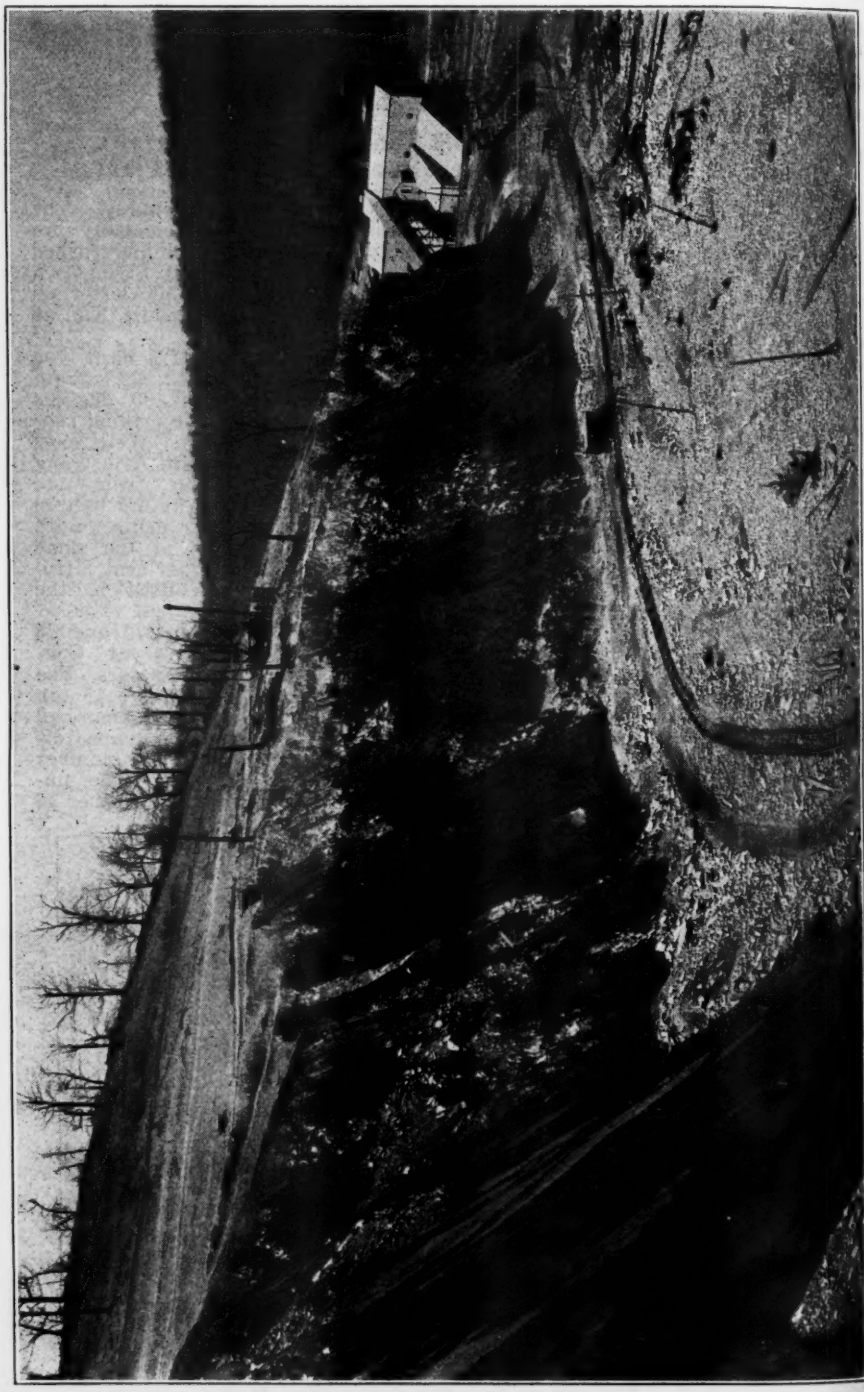
McALESTER, Oklahoma, has been called the "Pittsburgh" of the Southwest. The city is situated in the heart of the Oklahoma coal district. The mines in and around this city produce more than three fourths of all the coal mined in the state. The coal mined from this district is one of the highest grade, high volatile bituminous coals produced in the United States. It cokes well and has a high yield of gas which is rich in byproducts. Figuring the coal acreage at three dollars a ton the wealth of this district would be equivalent to $60,000,000,000.

Agricultural development in and around McAlester has made rapid strides in the last few years. The staple crops of this district are cotton, corn, cane, seed and grass, millet, peanuts and oats. These products with the revenues from the fruit and vegetable business, the cattle and poultry business give enormous revenues from the agricultural resources. These factors of coal production and agricultural resources are important market factors to the Stringtown Crushed Stone Company. The general offices of this company are located in McAlester and the crushed stone plant is located at Stringtown thirty-nine miles from McAlester on the main line of the Missouri, Kansas and Texas Railroad.

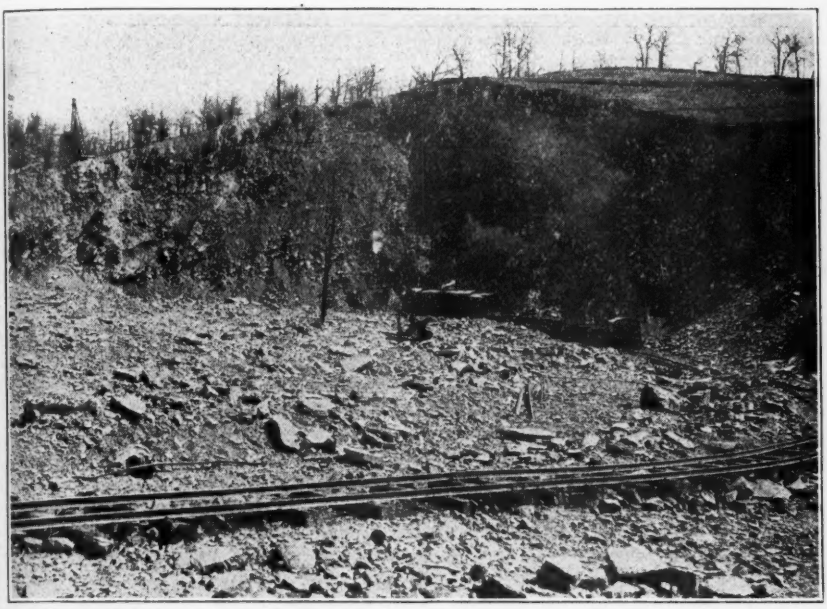
The quarry consists of a hard blue stratified limestone with the strata leaning to an angle of 85 degrees with the horizontal. The drilling consists of two operations. Well holes are drilled at the top with Armstrong and Sanderson cyclone drills and snake holes are drilled at the bottom with Sullivan tripod air drills. Both sets of holes are shot at the same time. Forty and sixty per cent nitroglycerine dynamite is used in the shooting.

The stone is loaded by 70 and 75 ton Bucyrus shovels into 4 yard Continental and Western dump cars. The loaded stone is pulled by two 18 ton Davenport and one 18 ton American locomotives. The stone is dumped directly from the cars into a number 10 Allis Chalmers crusher. The material is conveyed from the crusher to

A General View of the Stringtown Crushed Stone Plant.



An Excellent View of One Section of the Quarry.

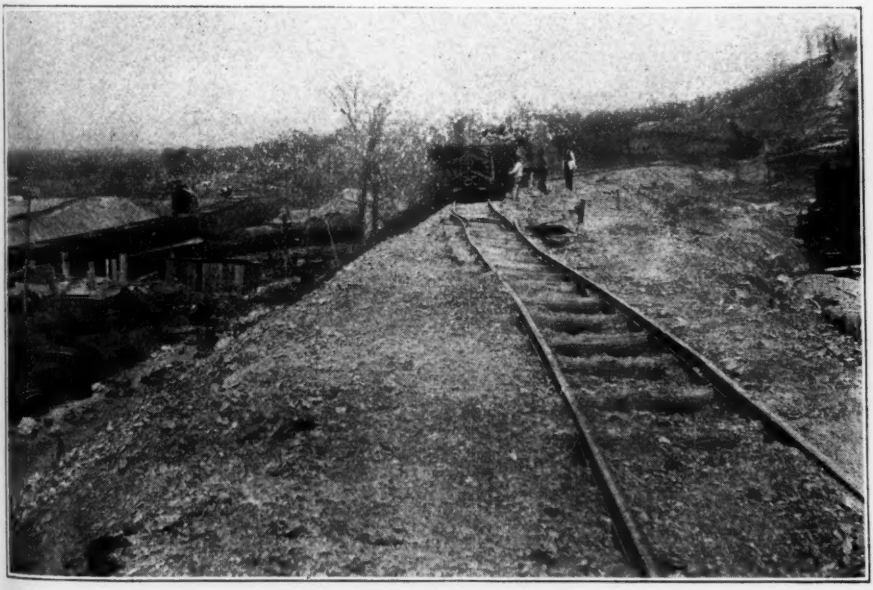


Another View of the Quarry.

the screens by a 36 inch conveyor of 150 feet centers and inclined at an angle of 20 degrees.

A ¾ yard Thew shovel is used in stripping overburden. There are 20 four yard 36 inch Western dump cars and 15 one yard 24 inch Western dump cars in use.

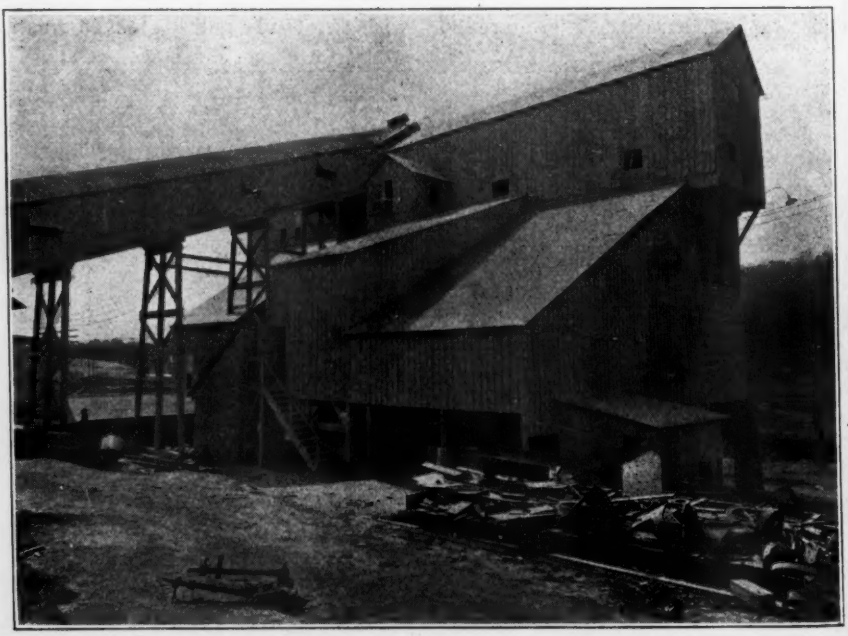
The screening plant is equipped with two 60x24 and one 48x20 Austin



View Showing Some of the Development.

An Excellent View of One Section of the Quarry.

Another View Showing Development Work.



A View of the Main Mill Building.

screens. The oversize from the first screen goes back to two number 6 Allis Chalmers crushers and one number 6 Telsmith and one number 4 Telsmith crushers for secondary crushing. This material is carried to the 48 inch screen by a Stephens Adamson bucket elevator. All the oversize from this screen is returned to a number 37 Kennedy gearless crusher which produces the small stone. The plant is also equipped so that material from any bin can be sent to this Kennedy crusher to be recrushed into smaller stone. Material from this Kennedy crusher is elevated to a 60 inch screen with another Stephens Adamson bucket elevator.

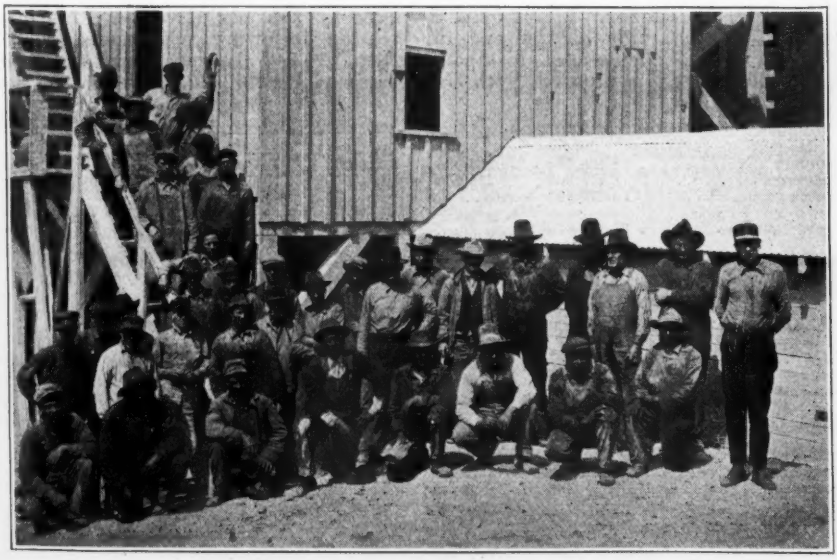
Loading into railroad cars is handled by regular Gates bins and the cars are handled entirely by gravity. All equipment in the plant is driven by motors. The electric power is obtained from a commercial plant about eight miles south of the crushed stone plant. The motors consist of one 150 H. P., one 100 H. P., one 75 H. P., two 50 H. P., and one 30 H. P. motors.

The annual production is 250,000 tons but the plant can produce 400,000 tons if business demands such production. When sales justify the Stringtown Crushed Stone Company operate two ten hour shifts. This night work has been carried on very successfully. Since the plant is electrically operated all that is necessary for night operation is to turn on the lights. The experience of this company has been that night operation can be made efficient by making the entire plant and that part of the quarry being used as light as day. This is accomplished by plenty of large lights. The night production runs about the same tonnage as the day. Why shouldn't it? To successfully operate at night the night crew should be required to produce the same tonnage as the day gang. The real trouble in most plants and also in this plant is to find the market for the stone produced.

The officers of the Stringtown Crushed Stone Company are W. F. Wise, president; H. C. Perry, vice-president and treasurer. R. M. Thacker is superintendent.

Cement Orders Large

Demand for cement is heavy and increasing not only in southern territory, but over the country generally, said John L. Senior, president of the Signal Mountain Cement Co. Signal's production is sold ahead for several months, and work on its new $250,000 unit is being pushed rapidly. It is expected to be in operation July 1, and adding 1,500 barrels a day the capacity will give Signal a total of 4,500 a day.



The Working Crew Assembled—A Good Bunch.

Portland Cement Statistics, February, 1925

The following tables, prepared under the direction of Ernest F. Burchard, of the Geological Survey, are based mainly on the reports of producers of Portland cement. The February, 1925, totals include estimates for one plant. February production is slightly below that of one year ago and that of one month ago but higher than other preceding corresponding months; shipments are higher than for preceding Februarys and show an upward trend for 1925, and stocks exceed all earlier accumulations.

Production, shipments, and stocks of finished Portland cement, by districts, in February, 1924 and 1925, and stocks in January, 1925, in barrels.

Commercial District	Production February		Shipments February		Stocks at end of February		Stocks at end of January,
	1924	1925	1924	1925	1924	1925	1925a
Eastern Pa., N. J., and Md.	2,600	2,486	1,361	1,490	4,067	4,746	3,749
New York	276	272	129	206	1,070	1,233	1,167
Ohio, Western, Pa., and W. Va.	708	593	461	404	1,735	1,977	1,788
Michigan	314	453	247	254	881	1,185	987
Wis.b, Ill., Ind. and Ky.	1,276	1,240	752	601	2,779	3,547	2,908
Va., Tenn., Ala., and Ga.	753	919	633	780	751	869	730
Eastern Mo., Ia., Minn. and S. Dak.c	921	499	572	389	2,868	3,248	3,138
Western Mo., Neb., Kan. and Okla.	403	388	436	468	1,227	1,498	1,577
Texas	363	339	268	374	400	343	378
Colo. and Utah	85	141	117	110	230	372	341
California	745	733	818	786	300	472	525
Ore., Wash. and Mont.	144	192	139	153	507	407	368
	8,588	8,255	5,933	6,015	16,815	19,897	17,656

a Revised. b Began producing and shipping June, 1924. c Began producing December, 1924, and shipping January, 1925.

Stocks of clinker, or unground cement, at the mills at the end of February, 1925, amounted to about 8,486,000 barrels compared with 7,017,000 barrels (revised) at the beginning of the month.

Production, shipments, and stocks of finished Portland cement, by months in 1924 and 1925, in barrels.

Month	Production		Shipments		Stocks at end of month	
	1924	1925	1924	1925	1924	1925
January	8,788,000	8,916,000	5,210,000	5,108,000	14,155,000	a17,656,000
February	8,588,000	8,255,000	5,933,000	6,015,000	16,815,000	19,897,000
March	10,370,000	.....	8,995,000	.....	18,189,000	.....
1st quarter	27,746,000	.....	20,138,000	.....	.....	.....
April	11,726,000	.....	12,771,000	.....	17,159,000	.....
May	13,777,000	.....	14,551,000	.....	16,403,000	.....
June	13,538,000	.....	15,036,000	.....	14,903,000	.....
2nd quarter	39,041,000	.....	42,358,000	.....	.....	.....
July	14,029,000	.....	16,614,000	.....	12,319,000	.....
August	15,128,000	.....	16,855,000	.....	10,666,000	.....
September	14,519,000	.....	16,827,000	.....	8,404,000	.....
3rd quarter	43,676,000	.....	50,296,000	.....	.....	.....
October	14,820,000	.....	17,160,000	.....	6,073,000	.....
November	13,141,000	.....	10,289,000	.....	8,928,000	.....
December	10,435,000	.....	5,506,000	.....	13,913,000	.....
4th quarter	38,396,000	.....	32,955,000	.....	.....	.....
	148,859,000	.....	145,747,000	.....	.....	.....

a Revised.

The imports of hydraulic cement in January, 1925, amounted to 229,838 barrels, valued at $361,098. The total imports in 1924 amounted to 2,010,936 barrels, valued at $3,116,564.

The exports of hydraulic cement in January, 1925, were 71,596 barrels, valued at $207,547 of which there was sent to Cuba, 34,052 barrels; to the other West Indies, 1,085 barrels; South America, 13,557 barrels; Mexico, 12,736 barrels; Central America, 7,740 barrels; Canada, 58 barrels; and to other countries, 2,368 barrels. These exports are exclusive of shipments to the following possessions: Porto Rico, 14,548 barrels; Alaska, 2,540 barrels; Hawaii, 361 barrels.

Night Quarry Operation

Written Expressly for PIT AND QUARRY by R. N. VAN WINKLE

WHY operate at night? The writer's answer to this question would be, Why not operate at night if it can be shown to be profitable to the producer? By the word profitable is not necessarily meant just the actual gain in dollars and cents between production cost and selling price, which may come back immediately. In the above connection the word profitable has another meaning, the expediency of rendering a service to a customer by meeting his requirements at a time when he needs your product, thereby making a booster for your company as well as a satisfied customer. His future business very frequently becomes not only desirable, but highly profitable.

Unless all precedents fail, it is expedient and sound business to render service to a customer and to take care of his requirements, even if in doing so you inconvenience yourself. Especially is this true if the customer is a shrewd man, for in the majority of cases you will profit many fold in future orders. Not alone will you profit in future orders, but you are, by this method, not having to replace old customers with new, which condition is practically stagnation. On the contrary you will be adding new customers to old customers who are increasing buyers. This means growth. This, however, is not always the result, as every rule must have its exception. A little psychology and salesmanship will generally clear one's mind as to what consideration he may expect from his customer in exchange for service or extraordinary service rendered him, and for the most part it will be highly profitable. Continued success was never accidental, and before taking up the other side of profitable quarry operation, this point of service cannot be stressed too much. Surely there are few producers, if any, that have not at one time or another given the question consideration and too have doubtless weighed the advantages to be gained therefrom in creating confidence and in broadening their business activities. The question of profitably operating at night, from the standpoint of gain in dollars and cents, is a very tangible matter. It is purely a matter of operating costs. The writer is convinced, from past experience, that night operation of a quarry can be carried on successfully in an emergency, profitably from the standpoint of gain in dollars and cents, and advantageously from the standpoint of service rendered and of satisfied customers.

If an operator has no method of obtaining daily or weekly production costs per ton or per unit, the advisability of his undertaking night operation is questionable; for operating or production costs are an essential in the successful handling of any business. There are two separate and distinct angles to quarry operating costs. First, it is necessary to determine what it is actually costing to produce a ton of stone, and second, it is necessary to determine what it ought to cost. Cost figures and cost data, as applied to the crushed stone industry, have been a hobby with the writer ever since he learned the rudiments of the business some fifteen years ago. By collecting and studying such data from various operations he has found that for each separate operation in the producing of a ton of crushed stone there are maximum limits of expenditure governing each separate operation, except perhaps in isolated cases. To be more explicit, by the use of this cost data and figures already collected certain limitations, not in dollars and cents, but in percentages of total operating cost can be placed on each separate item for successful operation. For successful operations there is a relationship that can be established between the cost of each separate operation and the complete operation, and this relationship can be expressed in percentages.

Quarry operators, as a rule, have been backward in freely discussing cost items, as it is embarrassing to have to go into an elaborate explanation of the peculiarities of their rock formation or stripping conditions, for instance, in an attempt to show why their blasting or stripping costs are five or ten cents per ton more when making a comparison. Cost items with the quarryman seem to be trade secrets, but a schedule or table could be prepared which would be a guide to operating cost items and a measure of comparison and check. While it is not attempted in this article to

give a complete list, it is possible to show by a partial table that there are certain maximum limits of cost expressed in percentages of the total cost that it is good practice to spend on certain operations.

Per Cent of Total Production Cost Usually Spent on Operations

Operation	Maximum Per Cent	Minimum Per Cent	Average Per Cent
Stripping	5.615	1.00	3.3075
Blasting	13.85	4.92	9.385
Labor	45.80	25.16	40.48
Depreciation	19.41	6.6	13.005
Fuel	19.275	5.965	12.62

The above figures are arrived at from dependable data collected as outlined and show that, irrespective of whether or not one has any knowledge of operating costs, or any knowledge of the stone industry, he can ascertain from the foregoing table that stripping, for instance, should cost somewhere between 1 and 5½ per cent of his total production cost and that the average is approximately 3 1/3 per cent of the total production cost. The same condition applies to blasting, labor, depreciation, fuel, drill labor, electric current, steam shovel repairs, lubrication, taxes, and liability insurance. This is a partial list only of the various cost items entering into the total production cost of a ton of crushed stone. Local conditions invariably govern items of cost, so to make a money comparison of, say the labor item in a quarry where labor is cheap and plentiful with one where it is high and scarce, is hardly fair. We know, however, by reference to the above table that if more than 40 per cent of your total production cost is labor, you are about at your limit for this item, while if the item of labor runs 25 per cent or less, you are among the favored ones.

Just what does the above have to do with operating a quarry at night? It is a simple matter to determine from any adequate cost system whether or not your costs for certain operations are excessive at night as compared with day and to determine whether or not they are within reasonable limits of good practice. Operating costs definitely control the difference between profitable and unprofitable night operation as far as income is concerned, and are the only sure means of comparison and of detecting minor leaks and waste. These are likely to be more prevalent in night operation due primarily to the fact that darkness is a handicap.

When at our quarry we decided to use two twelve hour shifts we split our organization, assigning our more reliable and experienced men to the night work, and then around a skeleton day organization which was left we built a comparatively new force of men. This was done, as can be readily appreciated, as a precaution against accidents. We felt that the older and more experienced men could better cope with the added handicap, knowing by experience the results of carelessness and thoughtlessness in this particular industry. While both shifts were paid on a basis of a twelve hour day, the actual operating hours per shift were only ten. This gave us a double crew of men for one hour in the morning and one hour in the evening when the shifts changed. This was done to give ample supply of labor and mechanics for machinery repairs, for throwing or building track or for doing any class of extra work necessary to enable us to do this work in a quick and efficient manner. There is an angle to double shift operations that sometimes causes considerable friction and that is the old game of "passing the buck" to the other fellow who operates any particular machine on the opposite shift. Often a man will claim that the other fellow is not doing his part in keeping the machine in good running order. To counteract this feature was one of our reasons for having the day and night shifts meet for an hour each morning and evening. The men could meet each other and talk over and repair the particular piece of machinery they were mutually interested in as operators. Ordinarily when one is brought face to face with a man and has interests in common with him, he finds that he is not as bad as he has pictured him, but is after all a pretty decent individual. At least this was the result we experienced with our men.

For the first night or two tonnage production was quite discouraging and our operations very ragged owing to the fact possibly that the men were over cautious, if such a thing is possible, and were awkward in working in the darkness. Our greatest difficulty was to accustom men in our train service to the use of lanterns in giving intelligent signals to locomotive engineers to enable them to spot cars where we wanted them. Pre-

vious to beginning night operations our steam shovel pit and tracks leading from the pit to the crushing plant had been illuminated with powerful electric flood lights placed at high and advantageous points on our crushing plants. The crushing plant proper had been equipped with electric lights, while we depended on gasoline banjo torches and pyramid kerosene torches to furnish light around our steam shovel. The reason for using such lights around the shovel was to provide something quickly movable owing to doby and block hole shooting in the steam shovel pit.

After the first night or so of preliminary operation it was astonishing how the men on the night shift became acclimated and overcame the hindrances that had previously retarded production. It was only a few nights before they were producing, not as great a tonnage, as they did not have as big an organization as the day crew, but they were producing stone as cheaply. This may be hard to believe, but there are elements and conditions that we found in night operations that are conducive to efficiency. For instance, the nights in the middle of summer, the time when this speeding up of production is necessary, are cooler and men work better. If a crushing plant is dependent on electric power, you will find less interference and a more constant supply of electric current. With the two shifts of men a friendly rivalry springs up which is helpful in increasing production. Men are at their assigned posts more regularly at night owing to a smaller organization and to the lack of outside interference, as there is nothing going on around them at night to distract their attention from the work in hand. We were able to carry on successfully every phase of quarrying and crushing with the exception of bank shooting, and this was done exclusively in the day time. Stone was loaded in railroad cars and billed out at night, in fact each shift was required to clean up all work even to detailed office work and to turn the job over to the next shift with a clean slate, making in reality two distinct and separate operations as far as records and work were concerned. It was only in this manner that we were able to procure adequate operating costs, which were the prime reasons for our being able to produce stone as cheaply at night as in the day time.

The biggest obstacle to be overcome in night operation is blasting. Blasting or shooting operations invariably are attended by a certain element of risk even in day time, and while they never can be handled in an offhand, haphazard manner, blasting or shooting at night warrants all the safeguards and extra precautions that can possibly be thrown around it. In our case only what shooting was absolutely necessary to carry on operations successfully was done, and this was limited exclusively to secondary blasting and was very limited. Caps and fuse were used, and fuse was lighted with irons heated in the steam shovel boiler, as secondary blasting at night was confined to operations in the steam shovel pit exclusively. Only stone that was too big to be handled and loaded in cars successfully was shot. The noise and reports from such shooting were far greater at night than similar shots fired under the same conditions in the day time, and this phenomenon was a matter of common discussion and speculation. The only reason that the writer can attribute to it is the fact that the atmosphere is denser at night and general conditions are more quiet making the blasts more noticeable. Blasting or shooting operations at night are spectacular, but flying fragments of stone are a constant menace owing to the fact that workmen cannot see them as they can in the day time.

The use of whistles on steam shovels and locomotives was curtailed as far as possible for signalling and in place a code of signals using hand lanterns with different colored globes was used. Different colored lanterns placed in varied positions had different meanings, and this means of signalling was found highly successful as the colored lights at night were quite distinctive and very noticeable. Our reason for curtailing the use of whistles and reducing blasting to a minimum at night was partially due to our desire not to court interference and complaints from residents and property owners near our quarry. This is a phase of night operation not to be overlooked.

We encountered no well founded objections or complaints that could not be overcome from our men, and they enjoyed it. It was a novel experience, and they realized that it was not a permanent thing. They welcomed too a relief from a 14 hour day, and while at first they complained about getting proper rest in the day time, we ar-

ranged separate quarters for the different shifts so that they did in no way disturb each other. Luckily for us we owned and operated our own boarding house on the premises so that we furnished at midnight a hot meal, a regular noon day meal, for the men on the night shift. Do not pass this over too lightly, as a good boarding house at any quarry is a great asset in holding men and keeping them satisfied.

The writer has attempted to give a somewhat brief outline of how we met and overcame an emergency of giving service by furnishing stone during our peak season operating period without a capital investment for new or bigger machinery or plant remodeling. It was an experiment, but the results were well worth the effort and prove that continually new occasions are arising in the crushed stone industry which demand new duties. One of these duties is for the man in charge to make a study of the quarry and crushing plant layout. One will be surprised at the possibilities of meeting and overcoming these new obstacles which he had not previously anticipated. The question of supply and demand is always prevalent in the crushed stone industry. If the demand for our product at times is greater than we can satisfy, we can either sit idly by and let new competition enter our field, or we can meet squarely these new occasions and "make hay while the sun shines" by increasing operating hours or working nights if necessary to meet the demand. If we expect to get our share of business, our share of good things, there is nothing like meeting these new occasions as they present themselves and meeting them in the least expensive manner possible.

Recent Patents

The following patents of interest to readers of this journal recently were issued from the United States Patent Office. Copies thereof may be obtained from R. E. Burnham, patent and trade-mark attorney, Continental Trust Building, Washington, D. C., at the rate of 20c each. State number of patent and name of inventor when ordering.

1,526.558. M i n i n g-machine. Edmund C. Morgan, Chicago, Ill.

1,526,618. Centrifugal sand-mixing machine. Algot A. Wickland, Chicago, Ill.

1,526,774. Operating mechanism for excavator-buckets. Le Roy P. Clutter, Washington, Pa.

1,528,189. Bucket, dump trip mechanism. George W. Frost, Milwaukee, Wis., assignor to Koehring Co., same place.

1,528,316. Crusher. Richard Bernhard, Allentown, Pa., assignor to Traylor Engineering and Mfg. Co., same place.

1,528,474. L o a d i n g-machine. Hames C. French, Chicago, Ill., assignor to F. C. Austin Machinery Co., same place.

1,528,741. Gyratory crushing machine. William S. Weston, Columbia, S. C., assignor to Weston & Brooker, Engineers, same place.

1,529,370. Ore-screening d e v i c e. Gus Nelson, Douglas, Ariz.

1,529,391. Power-s h o v e l, Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,392. Power-s h o v e l. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,393. Power-s h o v e l. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,394. Power-s h o v e l. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,395. Shoveling-machine. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,396. Excavating - machine. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,397. Shoveling-machine. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,398. Power-s h o v e l. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,399. Excavating - s h o v e l. Paul Burke, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,499. Power-shovel. Arthur Orloff, Green Bay, Wis., assignor to Northwest Engineering Co., same place.

1,529,628. Excavating - machine. Jules Legrand, St.-Mande, France.

Santa Paula Rock Company Serves Only Local Market

Crushed Stone, Sand and Gravel, Cement Products Produced Market All Within Radius of Ten Miles Served by Trucks

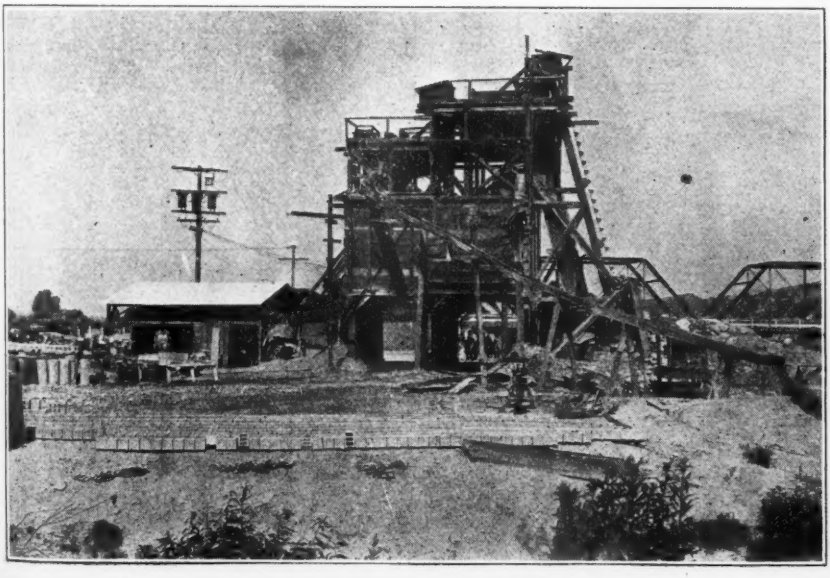
CALIFORNIA has the distinction of having more newly completed plants and more plants under construction that will serve the non-metallic industries than any other state at the present time. Some of these plants are among the most modern in the country.

The Santa Paula Rock Company has a modern plant at Willard Bridge producing four sizes of rock and one grade of sand. The company is in the cement contracting business also, and the plant supplies all the material consumed by this division of the business. In addition there is a cement irrigation pipe manufacturing works located adjacent to the plant. This phase of the operations utilizes all of the surplus sand. Cement building tile and cement brick are also manufactured.

The gravel is obtained from the bed of the Santa Clara river. The deposit averages two thousand feet in width and is tested to a depth of at least thirty feet. The material averages sixty per cent rock nearly all under eight inches. Boulders up to a ton are occasionally encountered. The water level is within three feet of the surface, so all excavation is under water. The gravel is very clean so washing is strictly secondary to screening.

The material is moved to a plant hopper by a drag scraper operated by a number 516 National hoist directly connected to a 50 horse power motor. The bucket was designed by the Santa Paula Rock Company and made for them in Los Angeles. It is similar to the Bagley type and is of one yard capacity. All rock over eight inches is removed by a grizzly and later broken by a hammer.

From the plant hopper the gravel is fed to a two inch grizzly by a plate feeder which is driven from the tail pulley of the elevator. Driving from the elevator insures stopping the feed whenever the elevator stops. The undersize from this grizzly falls to a 10 inch belt bucket elevator, and



Showing Plant and Cement Products Unit.

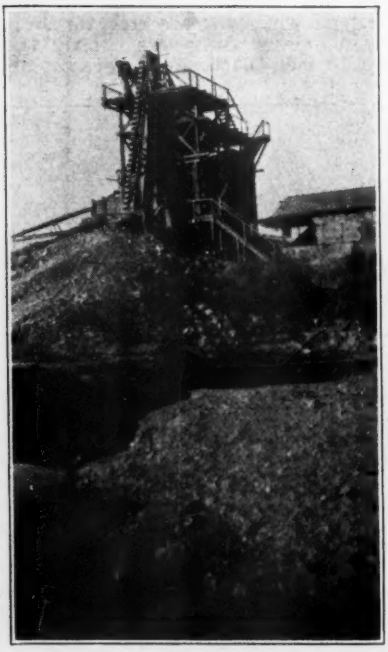
the oversize runs to a 9x18 Universal crusher, and after crushing returns to the same elevator.

All material is elevated to the head of the screening plant and is sluiced directly to the screens. Two jacketed Gilbert screens are located over the bunkers. The screens produce ½, ¾, and 1½ inch rock which fall into their respective bins. A sand is also produced which flows to a sand washer, and a 2½ inch rock which runs by gravity either to a bin or to a 9x12 Cedar Rapids crusher. The re-crushed rock falls back into the same elevator and is re-elevated to the screens. The sand is dewatered by a drag washer which has proved to be very successful for the conditions of small production and clean material.

Ample water is obtained from a small sump dug at one side of the main pit. The water is pumped by a 3 inch Fairbanks Morse centrifugal pump. Five Westinghouse motors, aggregating 100 horse power, run the entire plant and have proved very satisfactory for such wet and dirty work as they encounter in this plant. Three men operate the plant including all loading, checking out of material, and all repair work. All shipments are handled by United trucks.

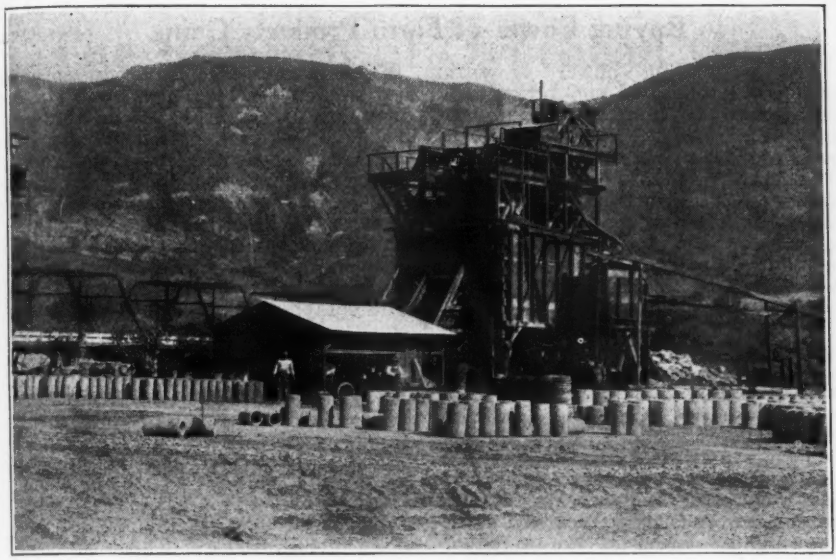
The cement products side line developed by the Santa Paula Rock Company include the manufacture of irrigation pipe of all sizes, cement building tile and cement brick. The irrigation pipe is made by a Herr pipe machine. This machine has a counter-balanced adjustable core which can be raised and lowered at will and an automatic tamping device. The outer jacket of the form is of light weight so as to be portable. It slides into notches on a revolving plate. The core is lowered inside, and a beveled ring is clamped inside at the bottom of the jacket to form a lip on the pipe.

Sand and ½ inch rock are dropped from the bins beside a bag size Blystone mixer. The material is shoveled into the mixer. Sufficient cement is added to make a one to four mix, and then the mixed concrete is fed to the pipe machine. The plate with the jacket on it is started to revolve and the tamper comes into action. The pipe is rapidly built up to its length of thirty inches. A ring at the top forms a groove which fits the lip formed on the opposite end. One



Showing Water Supply.

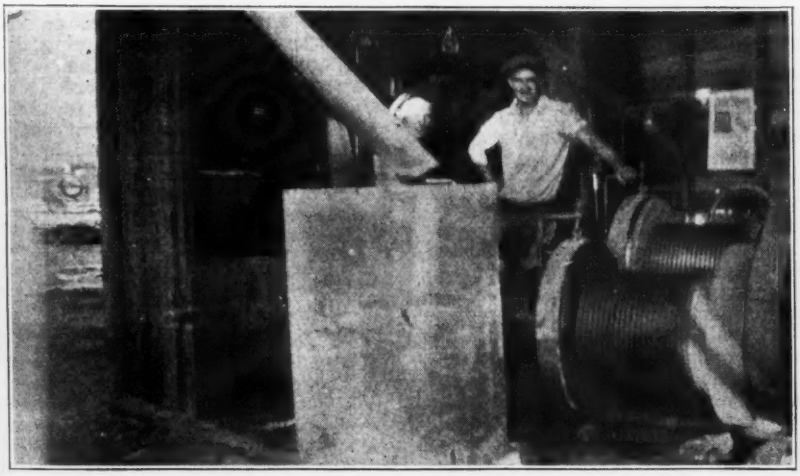
Deposit and Plant in Distance.



Another Plant View Showing Cement Products Storage Yard.

medium sized pipe is turned easily in a minute. The core is raised and the jacket containing the pipe is hauled away to the curing yards on pneumatic tired dollies. The jacket is then stripped off the pipe immediately and the pipe is given a two-weeks curing with water. Building tile and cement brick are produced on a small scale by hand power machines.

Bodinson Company of Los Angeles designed the plant, furnished the elevating and screening equipment and supervised the construction work. The plant has been in operation only a year, but in that time has developed a very profitable and easily served market. The plant at the present time is producing 300 tons per eight hour shift. All the surplus material is absorbed in the cement products business. While this is a small plant, it is a very well balanced unit with little, if any, waste. Mr. J. G. Bamesberger is in charge of operations.



Interior View of Hoist House.

Buying Power of Farm Products Gains

The purchasing power of farm products in terms of non-agricultural goods advanced from 85 to 88 in January as a result of a greater rise in farm product prices than in the prices of other commodities, says the Department of Agriculture.

The figures are based on a new method of calculation which gives substantially different results from those given by the method in use last year.

By the old method the January index of farm purchasing power would stand at 92 instead of 85. The difference is mainly due to the fact that the new index number is based on twice as many commodities as the old number. Instead of dividing agricultural commodities into two groups of field crops and livestock, farm purchasing power is now reckoned from the weighted prices of the principal groups of agricultural commodities taken together.

The gain in January was due to increases in all groups of farm products except the dairy and poultry group, which showed a seasonal decline. Non-agricultural products in January, according to the index number of the bureau of labor statistics, advanced from 163 to 165. The general trend of prices has been upward since last June. A further increase in business prosperity will probably stimulate the demand for farm products used as raw material in manufacturing and increased employment will mean a better market for food products.

Farmers up to the present have not benefited to the full extent of the advance in wheat prices. The farm price of wheat January 15 was $1.62 a bushel. The average price received by farmers for all marketings between July 1 and February 1, as indicated by reported monthly inspections, was about 1.24 cents.

Farm purchasing power as reflected in the department's index number 85 for January is the value of a unit of farm products in exchange for non-agricultural products at wholesale prices compared with pre-war values. This is obviously not a measure of the farmer's actual buying power, since it does not reflect changes in the volume or the cost of production since 1909-1914.

American agriculture in the decade 1910-1920 increased its production approximately 15 per cent, not by increasing the number of farm workers, but by increased efficiency. Here is a factor entering into the present purchasing power of agriculture which is not weighed in the process of arriving at index numbers. It may have brought about a net decline in the unit cost of farm production, despite increases in the cost of labor and equipment.

An exact measure of farm purchasing power would be the return for a unit of productive effort today as compared with the pre-war return, but no way to calculate such a unit has been devised.

Another approach made by the department to the problem of the farmer's purchasing power is in the form of an attempt to estimate the value of the farm dollar. In one sense the farmer's dollar is worth as much as any one else's. As, however, the farmer's dollar is not spent in the same way as the city-dweller's dollar, since a larger proportion of it goes for non-agricultural commodities, it figures the purchasing power of the farmer's dollar in terms of the amount of non-agricultural products it will buy at wholesale prices, as compared with its pre-war buying power.

The index for January is 61. This is a rough approximation, because the farmer's dollar is not spent exclusively for non-agricultural products, but also for farm products, particularly where specialized farming does not supply the farm table. The farmer's dollar index number is the same for January, 1925, as for January, 1924 and is three points below the level of last October.

FOOTE ELECTION

At the annual stockholders meeting of Foote Bros. Gear & Machine Company, the directors of the preceding year were unanimously re-elected. The directors are: J. T. Kerwin, W. C. Davis, A. W. Foote, Thos. J. Harper, Leo J. Doyle, Ralph M. Shaw, E. J. Robinson.

At the directors meeting following the stockholders meeting Mr. W. C. Davis was elected president, Mr. J. T. Kerwin, vice president and treasurer, and A. W. Foote secretary.

The Relation of Overhead Costs to the Determination of Prices

Written Expressly for PIT AND QUARRY by D. J. HUTCHINSON

THE principle is well recognized that unit costs in general and within certain limits vary inversely with the volume of production. It is also well known that this principle arises from the fact that the so-called invariable overhead expenses do not follow changes in the volume of production.

Of the three elements of costs, material, labor and expense or overhead, the latter contains of course some items such as manufacturing supplies that can be controlled in accordance with changes in the manufacturing schedule. In a large measure however, the overhead element is made up of what are very appropriately termed fixed charges, such as depreciation, insurance, taxes and in many cases interest as well. For the most part, these items are fixed by the amount of investment in plant, machinery, etc., and are nearly independent of the volume of business being done.

Depreciation, for example, may be somewhat less on idle equipment than on equipment in full use, and this item of cost may, therefore, respond to some degree to changes in the volume of production. Usually, however, this saving is more imagined than real. Not only does idle equipment deteriorate from lack of use and, therefore, lack of attention, but what is called depreciation is in many cases really obsolescence. Machinery and equipment that is kept in good repair does not depreciate greatly, but it does become obsolete whether in use or not. Depreciation is, therefore, practically speaking, an invariable or fixed charge.

Taxes, that is property taxes, are determined by the demands of public finance without respect to the monetary financial condition of the taxpayer. Hence, if we excuse the error of terming fixed an item which displays an irresistible tendency to increase, we may safely say that taxes are the most fixed of all charges. Likewise, if there is a funded debt, the semi-annual interest charges come around with clock-like regularity without regard to the speed with which the wheels of industry have turned meantime. Some saving may be effected in insurance during slack periods if the value of the stocks on hand is reduced but often this is not the case, and even when this saving can be made, it is in most cases negligible.

So it is with many of the other elements of overhead expense, such as superintendence. Labor can be laid off, but policy demands that the organization above a certain point be kept intact. Hence, while the overhead expenses are not strictly speaking absolutely invariable, they are so in the sense that they cannot be made to conform to the wide changes in the volume of production that occur in almost every industry.

These facts have been very generally known for a long time and are familiar to everyone. But just what to do with the excess cost that accumulates on sub-normal production continues to be a very troublesome problem. It is one to which business analysts, accountants and economists have given a great deal of thought, particularly in the past few years since the depression of 1921 and the period of recovery that followed.

It was recognized at the time that this period of recovery was considerably prolonged by the difficulty of getting costs down to a basis where prices could be established at which goods could be moved. Of course, the overhead items were not the only ones to blame nor the only ones that had to suffer. It was first necessary to cut the high priced inventories to a point where they could be sold. But this was not sufficient. The costs of new production also had to be reduced before goods could be turned out at a price in line with the reduced demand, and this was a long and painful operation, owing to the excessive overhead charges in most industries.

The expression was heard that "industry was geared too high"; it could operate but it could not make money on the scale to which it had been accustomed. A scaling down process was necessary, and the lesson learned on every side as this scaling down process advanced was that

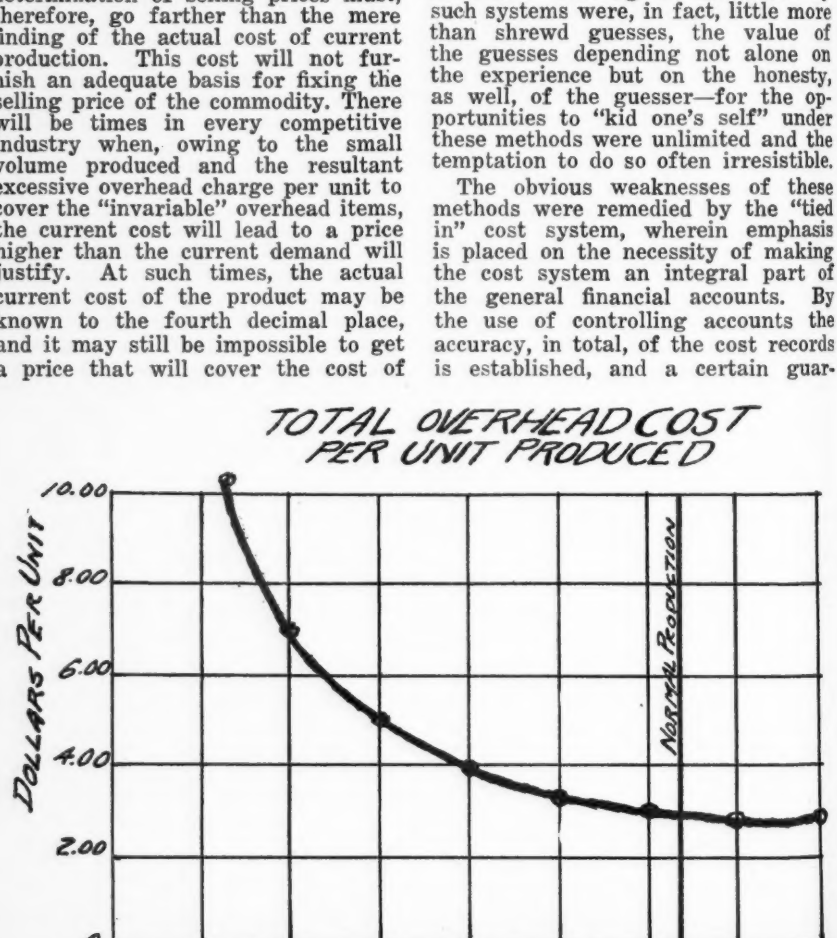
some provision must be made for taking care of the excess costs that result from decreased production other than loading them onto the current product at a time when it is least able to carry the load.

Decreased production may result from various causes, such as the seasonal variations in demand that are common in nearly every industry or from general business depressions. But whatever the cause of decreased production, the net result is usually the same, that costs go up at a time when in order to get business it is necessary for prices to come down.

Cost accounting in relation to the determination of selling prices must, therefore, go farther than the mere finding of the actual cost of current production. This cost will not furnish an adequate basis for fixing the selling price of the commodity. There will be times in every competitive industry when, owing to the small volume produced and the resultant excessive overhead charge per unit to cover the "invariable" overhead items, the current cost will lead to a price higher than the current demand will justify. At such times, the actual current cost of the product may be known to the fourth decimal place, and it may still be impossible to get a price that will cover the cost of production. The present development of cost accounting in the direction of standard or normal costs is looking toward a solution of this problem.

The history of cost accounting as a background to this present tendency may be briefly summed up as follows: We had, first, the so-called estimated cost systems. Such systems had no relation to the general financial records. Hence, there was no way to check the accuracy of the results, except by the final balance in the profit and loss account at the end of the year—a good deal like locking the well known barn door after the horse is stolen. The figures furnished by such systems were, in fact, little more than shrewd guesses, the value of the guesses depending not alone on the experience but on the honesty, as well, of the guesser—for the opportunities to "kid one's self" under these methods were unlimited and the temptation to do so often irresistible.

The obvious weaknesses of these methods were remedied by the "tied in" cost system, wherein emphasis is placed on the necessity of making the cost system an integral part of the general financial accounts. By the use of controlling accounts the accuracy, in total, of the cost records is established, and a certain guar-



antee given to the fact that the actual cost of production is being obtained. These figures are vastly more useful than those obtained by the estimated cost system, and for some purposes they will always be indispensable.

But it has become apparent that the actual costs as furnished by the tied in cost system are not sufficient for all purposes, particularly in relation to the determination of prices. For the reasons already suggested, the actual cost of production is often entirely out of line with the prices which can be obtained for the product. It is necessary, therefore, to have a price policy supported by some basis or principle other than the actual current cost of production.

The contribution of cost accounting to this need is the standard or normal cost system. Standard or normal costs differ from estimated costs in that they are constantly checked against actual performance records. It is not possible, therefore, to dispense with the actual cost records, although it may not be necessary to keep them up to date at all times. Under certain conditions standard or normal costs can be used and checked against tests made from time to time, thus eliminating much of the detail of keeping actual costs, particularly on repetitive operations.

However, it is obvious that the standard costs must be based on actual costs. In fact, they cannot be computed in the first instance without a careful study of what the actual costs have been in the past under varying conditions. But if carefully computed and constantly held in check standard or normal costs furnish a basis for price determination which cannot be supplied by actual costs.

Prices based on standard costs not only furnish a return over the actual costs under normal conditions, but something in addition as well to help absorb the excess costs which experience has shown will inevitably accrue on sub-normal production. This does not mean that prices based on standard costs will eliminate loss during periods of sub-normal production. Such loss very often cannot be avoided. But prices based on standard costs will assist in building up a reserve that will in part at least absorb such loss when it occurs.

The methods of determining standard costs are beyond the scope of this article, but we can indicate some of the factors to which careful attention must be given. In the first place, a careful estimate must be made of what constitutes normal production. The basis of this estimate is the capacity of the plant under the most favorable conditions, but normal production is ordinarily something less than this capacity, seldom more than eighty per cent. The standard cost system will fail if in a moment of enthusiasm the standards are set too high. Due regard must be had for such contingencies as breakdowns, temporary shortages of materials or labor, etc. Moreover, in estimating what percentage of total capacity may safely be taken at normal, the conditions outside as well as within the plant must be considered.

Thus it is well known that certain industries are substantially overbuilt so that if all the plants within the industry were to operate at anything like capacity, the total production would far exceed the total demand even under the most favorable circumstances. Those of socialistic frame of mind seize upon this fact as a justification of state control, whereby the least favorably situated and most uneconomical plants might be closed down and the others operated to capacity. But under competitive conditions this is not possible. All the plants will continue to operate on a necessarily reduced schedule, a fact which must be taken into consideration in setting the standards for any particular plant.

After setting the capacity of the plant at normal production, the next step is to establish the actual costs at that rate of production. The unit cost thus established will be the basis for the standard or normal cost to be adopted in determining selling prices. But the latter must necessarily be somewhat higher in order to provide for the excess costs that will accumulate in periods of decreased production. How much higher is one of the vital questions in determining standard or normal costs. Unfortunately, the data from which to formulate an answer to this question is in many cases decidedly incomplete.

In the first place, it is necessary to know the actual effect on costs of changes in the volume of production, often a difficult fact to establish with any degree of accuracy. Here the first difficulty is often encountered. As we have stated, the fact has long been known in a general way that

costs go up as production goes down and vice versa. But the exact extent and moment of such changes is with respect to the individual plant not so well known. The overhead costs for a period of years covering all the varying conditions of production should be studied. The results of such studies may be shown graphically in some such form as that shown in the accompanying figure.

It is well known that the overhead costs will decrease per unit of production as the volume of production increases. But such decrease will not by any means be constant nor will it extend beyond a certain point. From the accompanying graph it will be seen that the saving in overhead costs is very marked during the early stages of increase in production. As production reaches normal, indicated by the heavy line, the saving becomes very much less per additional unit of product. Finally as the full capacity of the plant is approached, the saving becomes negligible.

It is probable that the graph of overhead expenses in relation to volume of output for almost any plant in nearly every industry would show the same general characteristics as the one illustrated here. But there will be a vast difference between individual plants in the same industry, with respect to the points along the production line at which the greatest saving per increased unit of production will be realized, and this is a very vital factor in establishing the normal cost figures for the purpose of price determination.

The scheme of normal or standard costs in relation to price determination is based on the general principle of levelling out the hills and valleys in the cost graph. By taking as a basis of the selling price a cost which is less than the maximum but more than the normal an average is obtained which even with necessary variations will yield a more satisfactory return over a long period.

As we have noted, fluctuations in the volume of production results from two principal causes of somewhat different nature. One is the usual seasonal and temporary variations in demand that occur in nearly every industry; the other is the general business cycle of prosperity and depression. Leaving aside fluctuation of the latter sort, much can be done in the individual business to reduce, if not to eliminate, the seasonal and temporary variations in production by an intelligent price policy based on proper cost figures.

One obvious means of eliminating wide changes in the production schedule is to manufacture for stock during dull periods. In some highly seasonal industries where demand cannot be stimulated by any means outside of the usual buying periods, this is often a necessary recourse. But it has serious objections, not the least of which is that a program of manufacturing for stock requires extensive financing. Therefore, the manufacturer may turn to another commodity for which the demand is more constant or comes during his usual dull period.

This substitute commodity, as we may term it, is purely an overhead carrier. If it returns only the direct material and labor cost plus a small amount of the usual overhead charges, it represents a profit to the manufacturer at the end of ten years equal to the amount of overhead thus absorbed which will otherwise be a charge against his regular profit. But it is not necessary always to resort to a substitute commodity to secure the same result. The regular commodity may be sold during certain periods at cost or at an actual loss if the full overhead charges were figured in, and still show a greater net profit at the end of the year by virtue of such transactions, leaving absorbed a portion of the overhead.

The principle of price determination is widely used by railroads and other utilities. It is the principle behind the reduced rate offered by telegraph companies on the night letter for example, or telephone calls between certain hours. The plant and equipment having been provided, the overhead charges resulting from the investment go on whether the property is in use or not. During periods of comparative idleness, anything realized over and above the actual cost of the message is a profit.

By a careful study and distribution of overhead costs, the manufacturer can apply the same principles of price determination to spreading his total expenses over a wider base, stimulating production during slack periods with resultant increased net profit on his operations as a whole.

The Virginia Portland Cement Corporation of Norfolk, Virginia, is to spend approximately $1,450,000 to complete its plant in South Norfolk.

Tulsa Stone Company Operates An Economical Plant

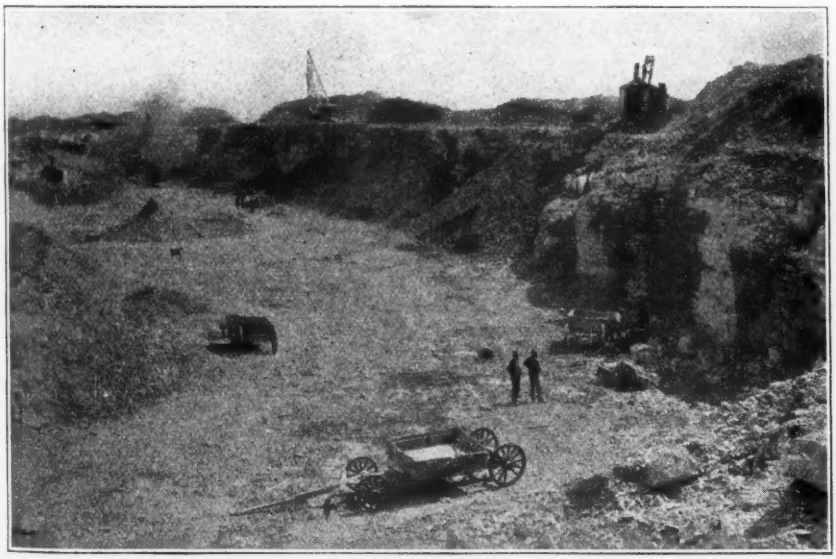
Machinery Producing Up to 95 Per Cent Rated Capacity Rigid State Inspection Makes Hand Picking Necessary

ELEVEN miles east of Tulsa, Oklahoma, situated on the Frisco Railroad, is the stone plant of the Tulsa Stone Company. This plant has recently been thoroughly overhauled and placed in excellent operating condition. It now is one of the most economically operated plants in the Southwest. The production has been brought to 500 tons daily on one shift and 900 tons with a double shift.

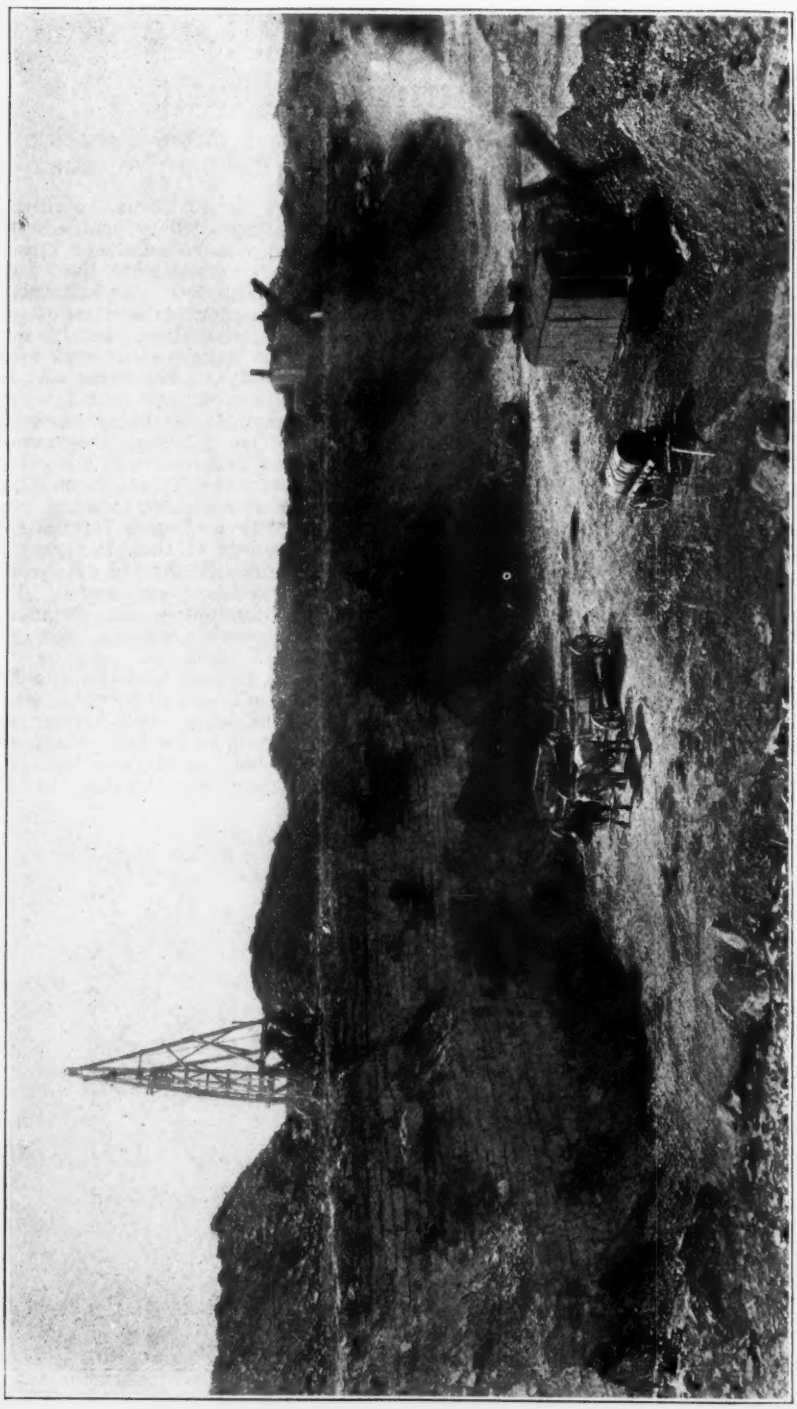
The plant was originally designed for a nominal production, but by increasing speeds on certain units, this company has been able to develop the output of all of its equipment to 95 per cent of its rated capacity. The stripping is being removed with a Thew traction type shovel. This shovel has been able to keep well ahead of a Sanderson Cyclone drill. A Ford tractor engine is used to swing a four inch bit in making the drill. This arrangement has proved to be very satisfactory as it makes from 30 to 40 feet per shift.

A Sanderson Cyclone drill with a 3½ inch bit is used in drilling. A small 5x5 Ingersoll Rand compressor is employed for drilling boulders that are too large to be handled. Due to bad weather conditions the Tulsa Stone Company has found it advisable to shoot about 4,000 tons of rock in the pit at one time. In this way they are able to keep clean rock available practically all the time. At the present time a 40 per cent Du Pont gelatin dynamite is being used for blasting. The Highway Department of Oklahoma enforces such a rigid inspection that the Tulsa Stone Company found it advisable to adopt hand picking. Shale and other foreign substances are left in the pit and piled in the center with the aid of an Erie ¾ yard traction type shovel. This plan has eliminated the expensive condemned rock problem for the company.

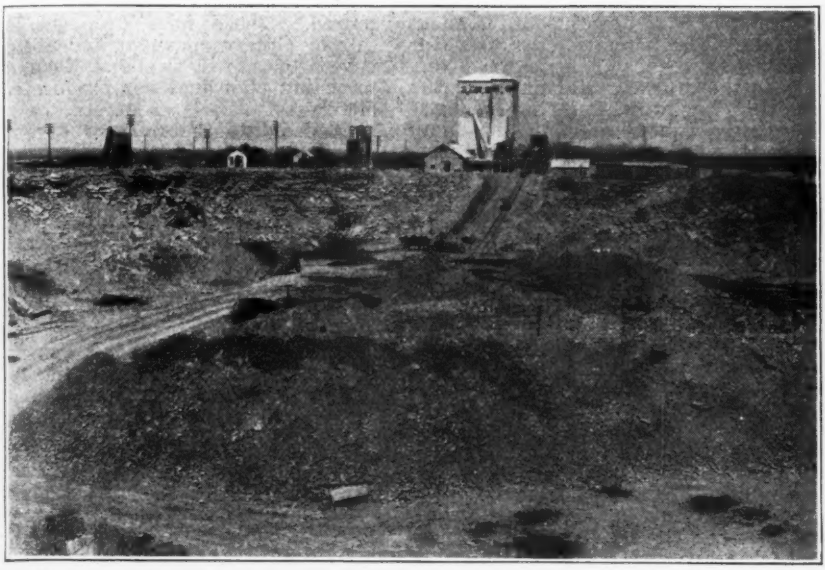
The hand pickers load the boulders into two yard dump wagons which are drawn by horses to a hopper into which the stone is loaded. Steel side dump cars are loaded from this hopper and they are hoisted to the



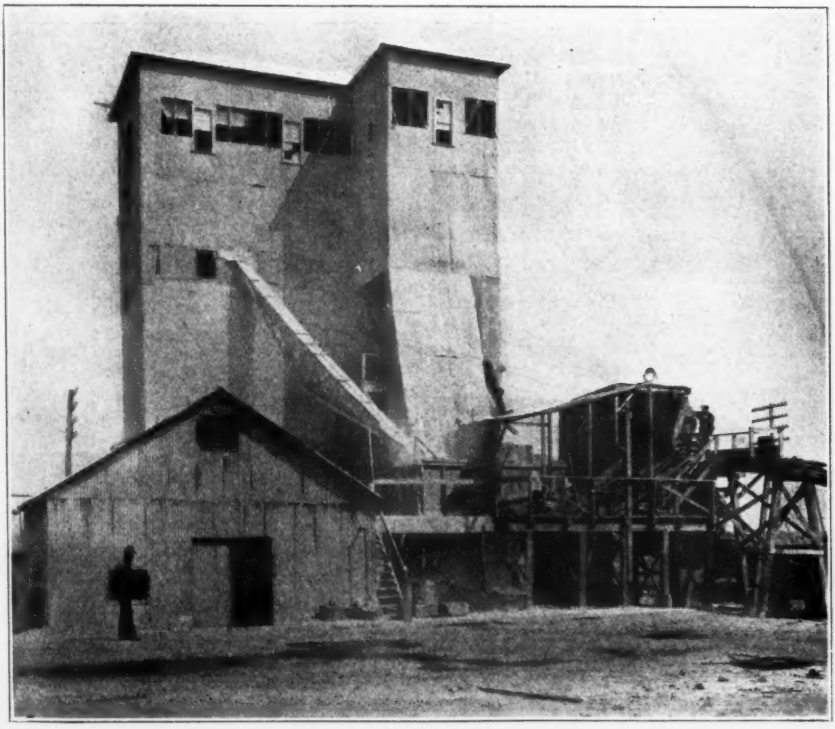
Quarry View Tulsa Stone Company.



An Excellent View of the Quarry Showing Foreign Matter in Deposit.



A View of the Mill and Quarry.



A Close-up View of the Mill.

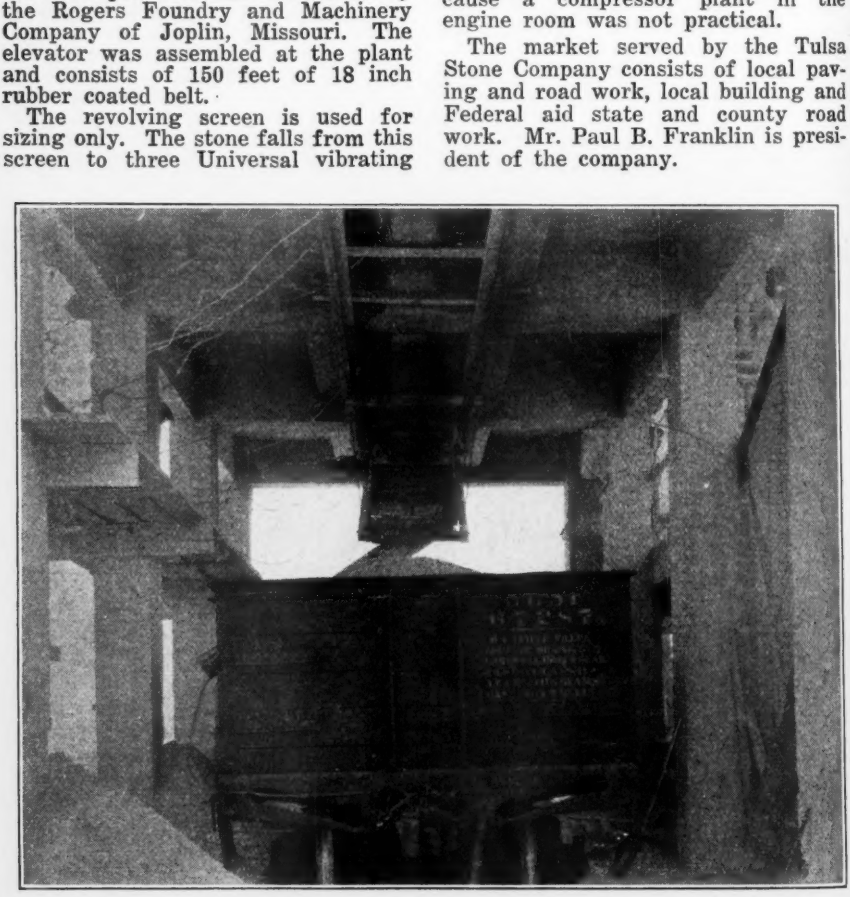
crushers. The haul from the bottom of the quarry to the crushers is about 35 feet. The industrial car used for loading from the hopper and delivering to the crushers was made by the Bunting Hardware Company of Kansas City. There are 16 of the dump wagons delivering to the hopper. The crushing plant consists of a number 6 and of a number 4 Austin gyratory crusher. The number 4 crusher is used for crushing the oversize entirely.

After crushing, the rock is conveyed by elevator to a revolving screen. This screen consists of two sections each 5 feet long. The first section has 1 inch openings, and the second has 2 inch openings. It is 4 feet in diameter and 25 feet in overall length. This screen will handle 100 tons per hour and was built by the Rogers Foundry and Machinery Company of Joplin, Missouri. The elevator was assembled at the plant and consists of 150 feet of 18 inch rubber coated belt.

The revolving screen is used for sizing only. The stone falls from this screen to three Universal vibrating screens, and the fines are all removed. These fines drop on to a Barber Greene conveyor and are conveyed to the dust bin. Even this screening plan does not produce completely clean rock, so before the rock is loaded into the railroad car, it is run over another Universal vibrating screen. This additional screening does produce a perfectly clean product.

Power is supplied by a four cylinder 200 horse power Reeves gas engine. The fuel for this engine is secured just across the road from the plant where a connection is made with a gas well. With this power the Tulsa Stone Company generates its own electricity for the screening plant and lights. A portable Ingersoll Rand compressor outfit was installed for secondary shooting because a compressor plant in the engine room was not practical.

The market served by the Tulsa Stone Company consists of local paving and road work, local building and Federal aid state and county road work. Mr. Paul B. Franklin is president of the company.



Showing Method of Loading Cars.

The Santa Fe Railroad Operates Texas Crushed Stone Plant

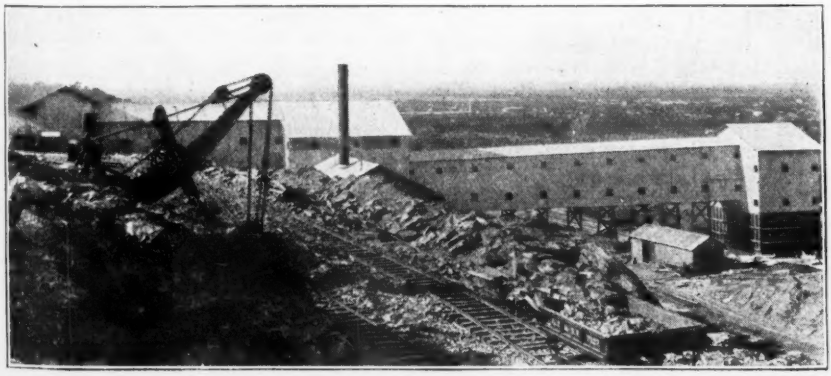
BROWNWOOD Rock Crusher is the name given to the crushed stone plant at Brownwood, Texas, operated by the Santa Fe Railroad. The entire output of this plant at present and probably for some time to come is consumed by the railroad. The crushed rock is used for ballasting the main line tracks, and the screenings are used for ballasting sidings, station platforms, etc. The plant is located about 1¼ miles directly south of the Sweetwater district of the G. C. and S. F. Railway. It is served by about two miles of spurs and sidings.

The buildings are of wooden frame and galvanized sheeting construction on concrete spread foundations. The quarry equipment consists of a 70-ton standard gauge Bucyrus steam locomotive, eighteen Western six yard side dump quarry cars, two 11x16 Davenport saddle tank locomotives and the necessary loading and running tracks of standard gauge. The dumping is done by hand. The Davenport locomotives are burning oil for fuel. The drilling is done by Ingersoll Rand air drills. The quarry consists of about 200 acres of almost pure limestone with an average rock face of 19 feet sloping away from the face to the back of the quarry on about a one per cent grade. This stone makes an excellent track ballast and concrete aggregate.

The crushing equipment consists of one number 12 type N Allis Chalmers gyratory as a primary crusher, one number 6 Allis Chalmers type K and one number 5 type Allis Chalmers gyratory crushers for the secondary crushing. One 60-inch by 20 feet Allis Chalmers revolving scalping screen and two 48 inch by 16 feet Allis Chalmers revolving separator screens over the rock bins constitute the screening equipment. Power is supplied by a 200 horse power Allis Chalmers corliss engine which is supplied with steam by two 72 inches by 18 feet Allis Chalmers return tubular boilers. Natural gas is used as fuel.

From the number 12 crusher the stone goes to the scalping screen on a 30 inch rubber fabric belt conveyor approximately 100 feet center and inclined at an angle of 15 degrees upward. From the scalping screen and the secondary crushers the crushed rock is conveyed to loading bins by a 30 inch rubber fabric belt conveyor approximately 200 feet centers and inclined at an angle of 1 degree 25 minutes upward.

The plant was designed by the Allis Chalmers Manufacturing Company and erected by the G. C. and S. F. Railway maintenance and construction forces. The work was done under the direct supervision of W.W. Wilson, Division Engineer of the Southern Division of the Railway. The construction of the plant was started March 1st, 1924, and completed July 1st, 1924. The capacity is 1,000 cubic yards per 10 hours.



The Brownwood, Texas, Crushing Plant.

Federal Trade Commission Changes Policy

Radical changes in the procedure of the Federal Trade Commission in the execution of its functions were recently announced after a reorganization conference under the control of the administration members, which have been in the majority since the recent appointment and confirmation of William E. Humphrey of Washington to succeed Nelson B. Gaskill of New Jersey.

Carrying out the wishes of President Coolidge for drastic reforms in the interest of fairness to American business institutions, the majority members of the commission, Chairman Van Fleet and Commissioners Hunt and Humphrey, announced three important changes in procedure against corporations complained of, to which the minority, Commissioners Huston Thompson and John F. Nugent, dissented.

1. No publication of complaints against corporations for violation of trade laws until the accused have been given time and opportunity to appear and show cause why complaints should not be lodged against them.

2. Adoption of a policy not to entertain proceedings of unfair practices in which the alleged violation is a private controversy redressable in the courts.

3. Determination to settle cases by stipulation, except when the public interest demands otherwise, the commission having decided that the law gives it discretion as to whether issuance of a formal complaint and trial are necessary.

For years the practice of the commission in giving publicity to complaints against individuals and corporations for violation of the unfair practices act has been regarded as a questionable one calculated to injure business reputations unjustly.

In a great majority of cases it has been found that complaints have not been justified and alleged offenders have been publicly branded before any opportunity was given to prove their innocence. The practice has resulted in widespread unfairness and the press has been appealed to on numerous occasions by innocent persons and corporations to set them right before the public when allegations published by the commission have been proved unfounded.

It has been the practice of the commission heretofore to give to the public a synopsis of every complaint immediately after it has been filed and before an accused has been given any opportunity to be heard. President Coolidge has regarded this as an injustice and had it in mind when he indicated a desire for reforms in the commission's procedure. The reforms and new rules adopted by the majority of the commission were set forth in a statement.

The document says in part:

"The Federal Trade Commission today announced the following changes in its rule of procedure and policies adopted by a majority consisting of Chairman Van Fleet and Commissioners Hunt and Humphrey. Commissioners Nugent and Thompson dissented, and will give out a public statement. The commission for the guidance of its force issued the following:

" 'Hereafter it shall be the policy of the commission not to entertain proceedings of alleged unfair practices where the alleged violation of law is a purely private controversy redressable in the courts, except where said practices substantially tend to suppress competition as affecting the public. In all such cases there must be three parties involved, the respondent, the competitor injured and the public.

" 'In cases where the alleged injury is one to a competitor only and is redressable in the courts by an action by the aggrieved competitor and the interest of the public is not substantially involved, the proceeding will not be entertained.

" 'The chief counsel is hereby directed to report to the commission with a memorandum stating his reasons and views all such cases now pending for the disposition of the commission, and the chief examiner shall also report to the commission all pending applications for a complaint where the examination in his opinion shows that said application comes within this rule.'

"In accordance with the foregoing, the commission amended Paragraph 3 of Sub-Division 2, headed 'II—Complaints,' after the word 'jurisdiction' the following: 'and if it shall appear to the commission that a proceeding by it in respect thereof would be to the interest of the public.'

Credit and Improvement

Written Expressly for PIT AND QUARRY by D. J. HAUER

ONE writer on quarry operation states that many quarries employ crude and inefficient methods and machinery because of the lack of capital and because of tradition or the influence of methods prevailing among operators in the section of the country. There is always an excessive cost to being hard pressed for money. No matter how much a man may wish to improve his plant, or how desirous he is of using better machinery, he cannot accomplish results unless he has money to start with or exceptional credit. There are ways of obtaining credit and capital in order to accomplish things that will be an improvement in the business. What others have accomplished, a man of ability and of determination can also accomplish. There are several ways of doing this.

A man can do much with first class credit even if he has little capital providing he has a growing business. Credit can be established, not only by paying bills but by giving close attention to other details of buying and arranging for credit. Paying bills promptly always gives a good reputation, but there are times when it is not possible to pay bills in full, and it is here that most business men fall down. They ignore creditors instead of seeing them and arranging for deferred payments. A business man is always annoyed when no attention is paid to bills and statements, while he takes a different attitude when someone owning him money comes to see him, explains his difficulties and tells how the bill will be taken care of.

Another aid to credit is the use of promissory notes and trade acceptances. A business man would prefer cash to a note; yet a note is of some value to him even if he does not have it discounted at a bank. A note is an acknowledgment of the amount of the bill, so that a dispute is not likely to occur as to when the note is to be paid. Most business men make a greater effort to meet a note when it is due than to pay a bill on open account. Although some banks object to them, trade acceptances to cover purchases are coming into more common use. They serve an excellent purpose in extending credit and in protecting the seller. Some companies are using these acceptances to do away with open accounts. On trade acceptances they are giving a longer credit than on open accounts.

Not only are notes and acceptances of value to the operator for buying, but they are helpful to him in his own selling. By their use he can keep down his open accounts and make his collections more promptly. With notes from his customers he can generally arrange for a good line of discount or credit with his bank, as these institutions are more willing to advance money on notes upon which they have two people as security than to make a direct loan on one man's note.

It is by these means that notes can be used in two ways to help a man's credit; in collecting money due him, and in making purchases with a limited capital. Another means of obtaining credit is by statements. Banks frequently, in statements submitted by customers, ignore certain resources in regard to plant and accessories. They will not extend loans based upon all resources that the operator may think good, but only upon those that they consider possessing a fair sale value. This is not true of many merchants and manufacturers who will extend a greater line of credit than the banks will give.

An operator should always have a statement of his resources showing the date of inventory and balance sheet. As every one wishes a late statement showing the value at the time the credit is asked, it is advisable to make up these statements every three months and have copies ready to present to those who desire them for business purposes. It is advisable to be rated with the leading commercial credit companies. This can be done by giving them statements each year. These companieis will make inquiries regarding a man's affairs, but they will be guided largely by frank statements of a business man regarding his own affairs. These will always be much more accurate than statements that may be gathered from creditors.

If a man, even though he has limited capital, is careful of his credit and establishes a good reputation for his integrity, he will find that he will

be able to make many improvements. If these improvements are not made, he works under a handicap. Another way of making improvements with limited money is to study various machines and methods of carrying on an operation. Finding where waste exists and thus cutting out useless expense makes it possible to economize and to purchase machines that will further reduce cost. This can be illustrated from experience.

Some years ago, before automobile trucks were on the market, a quarry man called the writer in to advise him how to reduce his costs. Deliveries were being made with horse drawn vehicles, and the quarry man owned twenty horses. He had a larger production than his twenty horses could deliver and his sales did not equal the demand from his customers. The first thought was to hire teams from other people, but the rates asked were such that the marginal profit on the entire business would be cut down. It was estimated that it would cost $250.00 to build a leanto on one end of his stables to house six additional horses, but this $250.00 was not available. The writer made a careful survey of the stables that housed his twenty horses. He also visited a number of livery stables and found that by changing the stalls in the quarryman's stables, giving each horse a little less room, yet sufficient to have the animal comfortable, he could meet the situation.

With the spare labor around the quarry, within a week's time and without increasing the payroll the old stalls were taken down and rebuilt. A few poles cut on the quarry lot made the post for the new stalls where they were needed. The horses needed were purchased from a dealer who took a note from the quarryman. In three months' time the horses had paid for themselves and netted a reserve fund of $400.00. This money was used to build a leanto at one end of the stable and more horses were purchased. Horses and wagons were purchased on notes. Within fifteen months thirty-six horses with enough wagons to use every horse had been secured. The deliveries were increased about seventy-five per cent in less than a year and a half through careful planning and the use of credit.

Another instance illustrative of the point was the case of a quarry where crushed stone was used with a small gyratory crusher. The stone was of superior quality, and the demand for it was so great that the quarry men had to deliver very little of it as customers sent their own trucks and teams to haul it away. The result was that the bins were always empty, and the quarrymen could have sold two or three times as much as was being produced. There was no available fund for purchasing and installing a larger crusher, using the old one for breaking the tailings.

It was found that the platform over the mouth of the crusher was so arranged that but little of the stone, when it was dumped from the vehicle which brought it from the breast of the quarry, entered the crusher. The result was that when stone was received rapidly at the crusher, three men were needed to feed the crusher and two men were kept at the crusher to keep it going. It was decided to rebuild the platform so that the stone, when it was dumped from the vehicle, would go into the crusher without being rehandled by the men, and would not only fill one side of the crusher but nominally the whole circle. The result was that with the stone coming fairly regularly from the breast of the quarry the crusher produced more stone and at a smaller cost. The two men at the crusher were put to work loading the stone at the ledge. A study was made there and some additional men employed to load the rock. The production of the quarry was increased 75 per cent, while the cost of production was lowered about 10 per cent. The operator was able to sell every ton of stone that was produced and found a demand for more. The extra money earned by this procedure was put aside, and before two seasons had passed, had reached an amount to warrant the installation of a crusher having twice the capacity of the old one. When this crusher was installed, the plant was partly rebuilt. Increased production and sales made it possible to complete the rebuilding during the following winter. Thus by changing methods and studying conditions improvements were effected and business increased.

The United States Gypsum Company announces the construction of a new gypsum plant at Blythe, California, soon to commence operations. As a result, a new form of gypsum known as structo-lite concrete with which fire-proof insulated homes can be built, will be manufactured.

Statistics and Charts in Business

By H. W. MUNDAY

THE executive of today wants facts, facts and more facts about his business, but he also needs to have those facts presented in a clear logical way, so that he can quickly size up the true situation and make proper and intelligent decisions. There is no better way of getting such results than by charts. The business men today are using charts more and more to properly manage their affairs. It is possible by the application of charts to think clearly, decide accurately, execute thoroughly and talk convincingly.

To aid in compiling these charts statistics of various kinds are necessary. The data for these statistics must come from various sources, from the accountant, the sales forces, the plant and from the world at large. The question of how much prices may be cut and yet realize profits is a bug-a-boo to the executive who has no means of estimating his volume of business. A chart would show at a glance the volume of business required to insure a fair return during the ensuing year. By studying such a chart the executive can readily see how profits rapidly increase as the volume of business grows larger. A few thousand dollars properly spent in pushing sales will be repaid many times over if it enlarges the gross sales.

Another mistaken idea brought to light by the chart is the relationship between labor, material and overhead. The average executive is eternally watching labor, trying to keep that item down to the limit. But a ten per cent reduction in labor makes only a small reduction in the total; while a ten per cent cut in overhead means a decided reduction in the cost of the goods.

The large sales organizations today all make use of charts and find them of inestimable value. It requires a minimum of effort and expense to collect data for charts if a routine procedure for gathering such information is adopted. Charts in themselves, unless properly made up, are a waste and a great deal of thought and care must be given to make a chart if they are to tell a true and complete story.

For example, a chart may be drawn that shows the total inventory value of materials on hand has not been reduced at all during a period of months, while the plant has been shut down. On the strength of that chart there appears to be something very wrong in the management. To tell the complete story, further details should be introduced. Such detail which should be on another chart, would show say out of $180,000 tied up in material over $145,000 is for special material that is applicable to a particular product and could not be sold except for scrap and as the plant was shut down there was no consumption. Thus the detail curves give a complete explanation of why the total value of materials could not be reduced.

As business gets larger executives have more difficulty in keeping in close touch with their business. When such conditions arise charts prove of greatest value. Charts are being used more and more in advertisements. For example, the "Swift Dollar" has become familiar to us all today because this large packing concern is trying by the best means known to show the public where their dollar goes when they buy any meat. By this figure the public attention is clearly focused on the important things in a manner similar to that used by a concern advertising automobile tire chains when they show a picture of an automobile accident on a slippery pavement. This graphic picture of a dollar chopped up into various segments is but one method of line pictures used by statisticians in charting.

Statisticians are becoming today more and more necessary as an aid to all businesses. The government too cannot function properly without the figures compiled by their experts. The greatest example of government use of statistics is in the compilation of the census. However, the people are just beginning to realize how much easier it is to digest these facts through the use of charts than to pour over a column of figures.

Some of the advantages in using graphic methods for presenting facts are as follows:

1. Graphic charts bring out facts clearly; often more clearly than a written or oral presentation.

2. Small charts may contain a great deal of information; often as much as a long written report and hence much time and effort are saved for the executive.

3. There is less danger of misinterpretation of data, if the chart is carefully prepared, than in a written report.

4. It brings out true comparisons.

5. It brings out facts which would be entirely overlooked in a written report or in a column of figures.

6. The peaks and valleys of a Curve make one endeavor to discover the cause.

7. Charts are easily prepared.

There is no standard method at present of preparing charts. As a result charts are often poorly prepared and hence easily misinterpreted. The graphic method of presenting facts is far from its greatest usefulness at the present. Universal standards would add greatly to the usefulness of charts. At the present time we have many different kinds of charts. These can be classified as follows:

1. Divided bars
2. Different sized bars
3. Different sized rectangles
4. Different sized circles
5. Sectored circles
6. Curves
7. Logarithmic curves

Bars and rectangles which differ in more than one direction are confusing. The reader is at a loss in comparing the figures. It is also very difficult to compare areas. In the sectored and comparative circle charts the reader does not know whether to compare diameters or areas. Bars of the same width and differing in length only are good charts for comparison. It is easy to judge comparative lengths. The data should be presented on the chart in such a manner that it can be readily used without detracting from the clearness and accuracy of the chart. Names and figures should be in columns at the left of the bars. There should not be any data at the end of the bars which differ in length.

The curve method is to be preferred to either bars or circles. The curve brings out a greater fund of information and has a greater variety of applications. It can be clearly and accurately read. The curve permits of finer interpretation than any other known method of presenting figures for analysis.

Logarithmic curves are plotted to a logarithmic scale which permits the showing of actual and relative values and actual and relative fluctuations. Ordinary co-ordinate paper does not show true ratio of change when curves are comparing amounts differing greatly in value or volume. When ordinary co-ordinate paper is used fluctuations in large factors are very noticeable while relatively larger fluctuations in smaller factors are barely apparent. Since the logarithmic scale is a scale of ratios this error does not appear. The principle of the logarithmic scale is the same as the slide rule. If paper for the logarithmic scale cannot be secured the scale can be made by copying from the slide rule. By indicating both absolute and relative values and changes the logarithmic scale combines advantages of both the natural and percentage scale without the disadvantage of either.

The statistics necessary in the preparation of charts will come from many sources. There is considerable data outside one's own business that is helpful.

An analysis of the census of manufactures will yield a wealth of information relative to the distribution of various industries about the country and the production of most lines of manufactured goods. While some of the reports published by the federal government are suitable only for broad surveys, there are many special reports issued by governmental or private agencies which bear on individual industries. These give the results of exhaustive inquiries and indicate the location and size of manufacturing plants, the sources of supply of raw material and labor, and the extent of the markets. Such information is of prime importance to a sales organization endeavoring to increase sales. Even simple statements of sales in the various districts of the field will, if rendered promptly and frequently, be a great aid to an executive in feeling the pulse of trade.

The field of financial statistics is perhaps the broadest of all fields and data of this character are used daily by most executives. Mercantile agencies issue weekly statement of market conditions which are supported by statistics of the volume of trade, prices of commodities, business failures, pig-iron production, building permits, and the like. Wall Street operators and financial publishers issue

daily or weekly summaries of stock-market conditions. In these are found statistics of the sales and prices of stocks and bonds, money rates, bank clearings, railroad earnings, foreign trade, and all figures of business activity which are of value to an executive. Many banking and brokerage institutions also issue economic analyses of trade conditions in general, with more or less detailed studies of activities in various industries. The backbone of some, if not most, of these analyses is statistics, of which the main part of the reading matter is the interpretation thereof.

Some of the larger corporations compile monthly reports of business conditions for distribution within their own organizations. The idea usually is to summarize business conditions in general, compare these with the results of operations of the corporation itself, and then interpret the correlation of the two. In the financing of business most executives find a summary chart of revenues, expenses, and net revenue. In the handling of the personnel of a corporation, statistics are usually compiled from the employees' service records to furnish information as to occupation, age, salary, and term of service. Such data when charted are useful in the selecting, training, and promoting of employees and are often of value for other purposes.

General business statistics will comprise: (1) Data taken from lines directly relating to and affecting a given enterprise or industry: and (2) information taken from the entire industrial field and considered as indicative and symptomatic of the trend and course of business. Business statistics of the last sort, popularly known as business barometers, cover a wide field and include interest rates, gold movement, foreign trade, construction, federal finance, foreign exchange rates, bank clearings, commodity shipments, wages, corporation earnings, new security issues, wholesale price indices, business failures, stock exchange quotations, pig iron and bituminous coal production, current quotations for week on cotton, corn, copper, etc., railroad net earnings, weekly federal reserve report and U. S. crop reports.

Statistics of general business conditions are available to the average business man through the Bulletin issued monthly by the Federal Reserve Board and through the Monthly Survey of Current Business and the issues of Commerce Reports, both published by the U. S. Department of Commerce. Attention is called to the service of the Chamber of Commerce of the U. S. A., first, in making available four to six weeks in advance of official publication the Business Indicators compiled by the Department of Commerce and which subsequently appear in that Department's monthly Survey of Current Business; and, second, in exclusively publishing weekly statistical information assembled by the Department of Commerce.

Few enterprises so dominate their field that safe deductions can be drawn solely from their own experiences as to the true condition of a particular slice of industry, and statistics of a given industry or trade when correctly charted give sales managers and others responsible for the setting of sales policies the position of the particular enterprise in relation to the entire line. It can then be determined whether a specific organization is holding its own or whether it is losing ground, making it perhaps desirable to start a special sales drive or campaign.

Sand Firms Consolidate

The Stewart Sand Company, largest producer and retailer of sand in Kansas City, has purchased the Kaw River Sand Company, the only other producer and retailer of sand here, it was learned recently.

In confirming the sale, John Prince, president of the Stewart Sand Company, forecast a reduction in the price of sand immediately after the merger of the companies has been completed.

He said the cost of production would be decreased, due to the merged facilities, and that the reduction in cost of production would be reflected at once in a reduction of the price of sand.

It was reported the price paid for the Kaw River Sand Company's property and good will was in the neighborhood of $400,000. Mr. Prince would not confirm the price involved in the sale.

Maior C. W. Bartlett, president of the Kaw River Sand Company, will become vice-president of the enlarged Stewart Sand Company, Mr. Prince announced. The Stewart Company, he added, would take over the Kaw River organization. Mr. Bartlett will be the only Kaw River company officer in the Stewart organization, however.

Loadings Break Records

Loading of revenue freight for the week ended on March 14, totaled 924,149 cars, which was an increase over the corresponding weeks in all previous years, according to reports filed by the carriers with the car service division of the American Railway Association.

Compared with the corresponding week last year, it was an increase of 7,387 cars and, with the corresponding week in 1923, an increase of 20,033 cars. It also was an increase over the corresponding weeks in 1920, 1921 and 1922.

The total for the week of March 14, however, was a decrease of 5,860 cars under the preceding week this year, largely due to decreases in the loading of coal and grain and grain products. Livestock and coke also showed small decreases but miscellaneous freight, merchandise and less than carload lot freight, ore and forest products showed increases.

Loading of merchandise and less than carload lot freight for the week of March 14 amounted to 259,489 cars, an increase of 2,152 cars over the week before and an increase of 8,368 cars over the corresponding week last year. It also was an increase of 30,297 cars over the corresponding week in 1923.

Miscellaneous freight loading totaled 34,223 cars. This was not only an increase of 11,912 cars over the week before, but increases of 27,482 cars over the same week last year and 24,114 cars over the same week two years ago.

Compared by districts, increases over the preceding week in the total loading of all commodities were reported in the Eastern, Allegheny, Pocahontas and Southern districts with decreases in the Northwestern, Central Western and Southwestern.

A comparison by weeks follows:

	1925	1924	1923
March 14.....	924,149	916,762	904,116
March 7.....	930,009	929,381	905,344
February 28..	862,910	944,514	916,624
February 21..	925,295	945,679	830,187
February 14..	902,877	935,589	816,646
February 7..	928,244	906,017	849,352
January 31...	896,055	929,623	865,314
January 24...	924,254	894,481	869,464
January 17...	932,150	894,851	864,297
January 10...	932,807	872,023	873,908
January 3...	765,727	706,292	727,246

Trade Association Methods on Trial

At Washington, D. C. on March 5th the question of the legality of statistical data distribution through trade organizations was on trial in the Supreme Court. This was the appeal brought by the Cement Manufacturers' Protective Association to have set aside a restraining order issued by the Federal District Court at New York, enjoining it from continuing certain trade practices.

John W. Davis, who opened the argument Tuesday, concluded today with a declaration that for the Government to win the present case, the Supreme Court would have to construe the Sherman Law as intended to put a premium upon ignorance among producers as to what was going on in their particular line of industry, and to sentence business men to solitary confinement.

Mr. Davis contended that the Government had failed to produce any evidence to show that any of the practices of the association were illegal. The manufacturers, he said, had not by agreement or concert of action fixed prices or restricted production and had through the association attempted only to ascertain the standing of prospective customers, to what extent there had been duplication of contracts, and to place in available form for their salesmen the freight rates to various points.

The association has appealed from a lower court decision restraining it from certain of its practices.

Pacific Coast Association Formed

A branch of the National Sand and Gravel Association, to be known as the Pacific Sand & Gravel Association, has been formed with headquarters in Los Angeles. At the request of producers in that section, V. O. Johnston, ex-president of the National Association and president of the Lincoln Sand & Gravel Company of Lincoln, Illinois, went to California to organize the producers there. As a result of Mr. Johnston's efforts, the new association has been formed which will maintain an affiliation with the National Association in conducting its local activities.

In addition to those who are already members of the new association, several other producers will join as soon as further organization plans are carried out. It is assured now that it will be an active organization.

A Few Hints on Selecting Motors

FOR any pit or quarry operator who is using power there is one of two important things to consider as to his plant. If electricity is used motors must be considered, the type and size to use and the care of them. If steam is used then the first consideration is the boiler and its efficiency and next the engine or engines.

The motors are known as either A. C. or D. C., meaning alternating current or direct current. This depends upon the kind of power being furnished to the plant, as it is not possible to use an alternating current to operate a direct current motor, unless a transformer is used or the motor changed.

Another consideration is the speed of the motors, for although it is possible by means of pulleys and shafts, with belts to change the speed between the motor and machine to be run, yet it is preferable to have the motor of the proper speed for the machine it is to operate. Speed is not made standard, for each manufacturer may slightly vary the speed from other standard makes. So in buying the desired speed must be known or specified.

One advantage in using electricity for power is that the motor can either be direct connected with the machine it is to operate by means of a split shaft, or by a short belt. Thus the cost of maintenance over a system of shafts and pulleys and long belts is reduced, and if one machine is stopped the motor on it is stopped at once and thus power is saved, as each machine has its own motor.

The size of the motor is governed by its rated horse power, motors being made from a fractional part of one horse power, up to very large motors of more than a thousand horse power. There are standard sizes beginning at 1/12 H.P. and going up. Thus a 1 H.P., 10, 20, 75, 100 H.P. and so on can be purchased. The size and the speed of the motor generally determines the cost.

There is also standard voltage for motors, the most common being 110, 220 and 500. Special voltage for large motors can easily be obtained. As voltage of a current will vary so the motors will operate on varying voltage as a 110 will go up to 125, 220 up to 250, and 500 up to 550.

Motors are also regulated for current, pressure and resistance. The current is measured in amperes, the electrical pressure in volts, while the resistance is in ohms. From a simple formula used by electrical engineers with any two of these units known or specified, the third can be calculated or determined. Thus motors are labeled showing all or at least two of these three forces, besides the fourth unit of horse power.

Thus to select motors without a knowledge of electrical engineering, the outline as given may prove helpful, and mistakes can be prevented in purchasing.

Progress Made on Gypsum Standards

Efforts of the standardization committee of the American Society for Testing Material to obtain new quality standards in gypsum products have progressed materially, it was announced Wednesday at the close of a two-day session of the committee at the Hotel Morrison. The work of the session just closed was concentrated on the adoption of quality standards for gypsum tile, floors, roofs and boards.

Limitation of the products to standard sizes to be in line with a conservation movement now pervading all industry also has been one of the accomplishments of the standardization work which has been going forward in the gypsum industry since 1916. The work at the present time is under the direction of Warren E. Emley of the Bureau of Standards, Washington, as chairman of the committee.

Need for continuance of the study is emphasized by the fact that the United States, with 65 gypsum industries, five of which have headquarters in the Chicago district, is far behind Canada and Germany in the uses to which gypsum products can be put, according to Virgil G. Marani, chief engineer for the gypsum industries.

The Bessemer Limestone & Cement Co., Youngstown, O., is soon to let the contract for construction of concrete cement storage tanks.

Giant Portland Cement Co., Egypt, Penn., has a plant improvement program under way. The work includes the installation of machinery in the clinker mill and other departments.

New Hardinge Catalogs

BULLETIN Number 18, just issued by the Hardinge Company of York, Pennsylvania, is entitled *Fine Grinding With Tube Mills*—The Conical Tube Mill. "The value of the Tube Mill as a medium fine, and extremely fine grinding device," they say in introduction, "is becoming better known and better understood in the industrial fields for both wet and dry grinding. The Pebble Mill is able to produce a larger percentage of uniformly fine material without outside separating devices than any other type mill. The long cylinder Tube Mill, in contrast to the short cylinder Hardinge Conical Mill, is adapted to uses where fine grinding is done in open circuit. They operate well in closed circuit with classifiers or separators of different kinds, where extremely fine products are desired."

Bulletin Number 19 is entitled *Grinding and Mixing with Batch Mills*,—The Cylindrical Batch Mill and The Hardinge Conical Batch Mill. Batch Mills are widely used in pulverizing and mixing many materials required for industrial and chemical purposes, especially satisfactory for small quantity production or exceedingly fine grinding. They consist in general of hollow grinding drums, lined with porcelain or flint to protect the shell, and to prevent contamination of the product. The grinding media consists of pebbles, porcelain balls or metal balls. The proper amount of the grinding media usually half fills the mill. The material to be ground—about ⅔ the volume of the grinding media, or a little more than ¼ the total volume—is then dumped in, and fills in between the interstices. Full construction details are given.

The Falk-Bibby Coupling was invented by James Biddy and is manufactured in England by The Wellman Bibby Company, Ltd. The Falk Corporation has acquired the exclusive manufacturing right in the United States under the Biddy Patents, and has equipped its plant with special machinery for manufacturing these couplings in any quantity and suitable for all purposes where flexible couplings are used. They are said to have proven thoroughly efficient and reliable under the most exacting conditions, and in successful use here for five years past.

The Court of Achievement

CHEMICAL products, equipment and processes, in fact, all new developments of American chemistry of the past few years, will each receive unusual recognition at the Tenth Exposition of Chemical Industries to be held this year during the week of September 28th to October 3rd at the Grand Central Palace, New York. Plans for the new "Court of Chemical Achievement," inaugurated at the recent meeting of the Advisory Committee of the Exposition, are rapidly taking shape. Outstanding achievements of American chemistry, whether in the research or industrial field, which have been completed during recent years, will be admitted to the Court after they have passed a committee of approval of the American Chemical Society.

The new "Court of Achievement" which bids fair to be the outstanding feature of the Chemical Exposition this year, will be in the form of small unit exhibits together in one large specially arranged group. Among the new products which have been suggested to be displayed and explained by members of the American Chemical Society, who will oversee the exhibits, are 27 recent developments. This list will probably be increased several times by other new chemical products, instruments, and explanations of new processes.

All exhibits will be passed upon and admission to the "Court of Achievement" granted by a committee of the American Chemical Society known as the Committee of Approval, which is composed of Marston T. Bogert, chairman, C. M. Stine, E. R. Weildlein, F. W. Willard and John Johnston. A subcommittee of the Chemical Exposition Advisory Committee composed of H. E. Howe, chairman, F. J. Metzger, and T. B. Wagner, will act in an advisory capacity to the exposition management in the general conduct of the new project.

Entries for new products and processes for the Court of Achievement must be sent to Court of Achievement, Room 1102, Grand Central Palace, New York, prior to May 1st, after which time applications will not be considered. A nominal fee will be charged for all exhibits in the Court except those of institutions of learning and Government bureaus or departments.

A. D. Little, New Chairman of Chemical Exposition

ARTHUR D. LITTLE, president of Arthur D. Little, Inc., of Boston, was elected to succeed Charles H. Herty as chairman of the Advisory Committee of the Exposition of Chemical Industries at a meeting of the committee held at the Chemists Club, New York, on February 24. Dr. Arthur D. Little is one of the most widely-known chemical engineers in the United States and one of the pioneers in the modern American chemical industry. He is president of one of the largest research and engineering organizations in the world, the founding of which dates back to 1886. Dr. Charles H. Herty, who resigned from the chairmanship of the Advisory Committee owing to the pressure of other duties, is president of the Synthetic Chemical Manufacturers' Association of the United States. He has been chairman of the committee for ten years, serving since the inception of the Chemical Exposition in 1915. He remains a member of the committee.

Dr. Little has won wide recognition in the past two decades as an author of scientific works and as a research pioneer, especially in the chemistry of the paper industry and in the development of artificial silk. His production of a beautiful artificial silk purse from sows' ears at the Boston Laboratory in 1921 created a stir all over the world. It proved his contention that chemistry cooperating with industry could bring about apparently impossible results, and his work has helped the rapid development of artificial silk during recent years. Both Arthur Little and Charles Herty are past presidents of the American Chemical Society, Dr. Little having headed that organization in 1913. He has been a member of the Exposition Committee for ten years past.

This, the Tenth Exposition of Chemical Industries, will be held at the Grand Central Palace, New York, September 28 to October 3, 1925. A feature of this exposition will be a Court of Achievement in which new products of chemical developments brought out in the past few years will be shown. These will include a long list of chemicals and synthetics, chemical products and other materials contributary to man's well being and shelter, covering, the treatment of disease, transportation, intercommunication and so on.

Those having new scientific products suitable for showing in this court should communicate with the Tenth Chemical Industries' Exposition, Grand Central Palace, New York. Already over 100 separate units are accepted for exhibition. Fuller details of plans and methods will be announced later.

The Lime Convention

The Seventh Annual Convention of the National Lime Association and the Twenty-Third Annual Meeting of Lime Manufacturers will be held from May 26th through May 29th at Briarcliff Lodge, Briarcliff Manor, Westchester County, New York. The convention will follow the lines of the one held last year at White Sulphur Springs, West Virginia. The mornings and some of the evenings will be devoted to reports of work accomplished during the past year, results of fellowships and talks by well known speakers on manufacturing problems. It is proposed that another Round Table Research Conference be held on one evening. The first of these conferences held last year was very well attended and was of considerable interest to everyone connected with the industry. There will be considerable time set aside for such sports as golf, tennis, swimming, quoits, baseball, etc. The convention will be concluded with a banquet and entertainment.

Hill Clutch Appointment

Announcement has been made by the Hill Clutch Machine and Foundry Company of Cleveland of the appointment of T. L. Rose and Son as their representative in Pittsburgh and adjacent territory. Mr. Rose has been prominently identified in the power transmission field for more than twenty-five years, and has excellent facilities for representing the comprehensive line of "Hill Clutch" mill equipment. This line features: "Smith Type" Hill Friction Clutches, "Cleveland Type" Collar Oiling Bearing, "Industrial Type" Spur Gear Speed Transformers, "Steelarm" Automatic Belt Tighteners and Agitator Equipment of all kinds.

T. L. Rose and Son, who are located at 901 House Building, intend to give their clients a special engineering service in transmission problems.

European Business Grows Since War

Changes in the trend of America's foreign trade since the beginning of the war are outlined by the figures prepared for the trade record of the National City Bank of New York. They especially show very large increases in the movements of merchandise between the United States and Asia, Oceania and Latin America, comparing 1924 figures with those of the year preceding the war.

Official figures of the imports from Asia and Oceania are $980,000,000 in 1924, against $329,000,000 in the fiscal year 1914, all of which preceded the opening of the war; and from South America $466,000,000 against $223,000,000.

The exports of these three grand divisions show equally striking gains, those to Asia and Oceania in 1924 being $671,000,000, against $197,000,000 in 1914, and to South America $315,000,000 against $125,000,000. From Central America the imports of 1924 are $37,000,000 compared with $18,000,000 in 1914, and from Cuba $362,000,000 against $147,000,000. The exports to Central America are $65,000,000 against $37,000,000 and to Cuba $200,000,000 against $68,000,000 in 1914.

Corresponding figures of the trade with Europe show that the imports from that continent in 1924 were $1,960,000,000 against $896,000,000 in 1914, and exports thereto $2,455,000,000 in 1924, against $1,486,000,000 in 1914. With Africa, there is also a marked gain in trade, the imports from that continent being $72,000,000 against $19,000,000 in 1914.

The percentages of increase in the trade with the grand divisions, however, show even more distinctly the striking advance in the United States commercial relations with Asia, Oceania and Latin America. The 1924 imports from Asia are 224 per cent greater than in 1914, and the exports thereto 385 per cent in excess of those of 1914. From South America the imports are 109 per cent higher, while the exports thereto are 152 per cent in excess of those of 1914. From Europe the increase in imports is 22 per cent and the increase in exports thereto 6 per cent.

The striking increase in the United States trade with the countries fronting on the Pacific is further evidenced, says the "Trade Record," by a comparison of the exports of 1924 through the Pacific ports of the United States with those of 1914, the total value of the exports from the United States through the Pacific ports in 1924 being $447,000,000, against $132,000,000 in 1914, and the imports through those ports in 1924 $478,000,000, against $149,000,000 in 1914.

This big gain in the United States trade with the Orient and our Latin American neighbors, adds the "Trade Record," is due in large degree to the increase in importation of manufacturing material such as silk, jute, wool and hise and a corresponding increase in the exports of manufacturers to the non-manufacturing world, suggesting that the manufacturers of the United States are paying with the products of their factories for the increasing quantities of foreign material being utilized by them.

Governor Silzer Claims a "Trust"

Governor George S. Silzer of New Jersey in a speech before the first annual convention of the Association of Highway Officials of the North Atlantic States, claimed that there is a "cement trust" which illegally fixes one price for the product, eliminating competition and keeping up the cost of road building. He declared that "we require more roads, better roads, wider roads, substantial bridges, and the abolition of grade crossings, and it is of the utmost importance that roads he well and honestly built."

After saying that the basis of most roads is cement, he urged the six states represented to join in getting the federal government to "prosecute the combine of cement companies." Otherwise, he said, the states should establish their own cement plants.

Governor Silzer also advocated abolishing of federal road aid to the states, saying that the states only receive back a small proportion of the large amount paid to the federal government. He proposed that the states spend their own money for this work, under a co-operative arrangement. He referred to a case in New York state when the government indicted a number of cement companies for conspiracy to fix prices. There was a disagreement and the case was never re-tried.

U. S. Industries Improving

A CONSERVATIVE but continued improvement in industrial conditions is indicated for the entire country by the monthly report of the National Industrial Conference Board for January, completed and made public. A slight increase is noted in the purchasing power of the dollar, since the cost of living, it was found by the board's statistical experts, decreased 1.1 per cent between January 15 and February 15.

Factors making for improved industrial conditions in January were increased employment, increased working hours and an increase in the average weekly earnings of all workers. A net increase in employment of slightly more than 2 per cent occurred from December to January, gains being reported by seventeen industries, while eight showed a decrease, somewhat in line with seasonal requirements. The average work week per wage earner increased from 47.9 to 48.7 hours. Average weekly earnings rose from $26.85 in December to $27.09 in January, slightly surpassing the level of January a year ago, when the average stood at $27.05.

Even the situation of the workers in the northern cotton mills, whose wages had been subject to reductions, was better in January, increasing working hours raising their average weekly earnings from $20.32 to $20.61. With his weekly earnings in January, the worker could buy the same goods and services as he could during the preceding month, the index number of "real" weekly earnings computed by the conference board remaining unchanged at 129. This despite a slight advance in cost of living from December to January, which was offset by the increase in weekly earnings.

Average hourly earnings of all wage earners declined slightly from 56.1 to 55.9 during the month, but coincidence of this with increased employment leads the conference board to the conclusion that the hourly average in wages was lowered by the putting on of additional workers at lower rates of pay.

The more pronounced gains in employing occurred in the following industries: Agricultural implements, automobiles, cotton (in the North), silk and foundries. Industries showing the greatest increase in working hours were the boot and shoe, cotton (northern), leather tanning, rubber, silk and foundry industries. Increased weekly earnings were reported in the boot and shoe, hosiery and knit goods, iron and steel, leather tanning, wool and foundry.

H. F. Janda.

Janda To Assist Upham

Announcement is made by Mr. Chas. M. Upham, Director of the Highway Research Board of the National Research Council, of the appointment of Mr. H. F. Janda as Assistant Director. Mr. Janda is especially fitted for this position. He is a graduate of the University of Wisconsin, and for two years was Assistant City Engineer at Portage, Wisconsin. Mr. Janda has not only had a variety of practical experience in engineering, but has also acted as Instructor and Assistant Professor of Civil Engineering at the University of Cincinnati for five years. As Associate Professor of Highway Engineering at the University of North Carolina for three years he was in charge of experimental research in cooperation with the State Highway Commission. Mr. Janda has carried on many important research projects, including Capillary Moisture in Highway Subgrades, Earth Pressure tests on Culvert Pipe and other problems affecting highway construction.

Leading Industries Show Payroll and Job Increases

Forty-four of the principal industries in the United States showed increased payrolls in February over the preceding month. Employment in all industries increased 1.6 per cent, showing the same steady progress which it has maintained since last August. Aggregate earnings of employees increased 6.6 per cent and per capita earnings increased 4.9 per cent.

The greatest increase in per capita earnings was in the automobile industry, this indicating a number of wage increases. However, reductions were made in the wages of 16,000 employes in the cotton goods industry.

Figures compiled by the bureau of labor statistics show increases in employment and in payroll totals for February in each of the nine geographic divisions of the country.

There were gains in employment in February as compared with January in eleven of the twelve groups of industries, the one exception being in the food group, which, however, lost only one-half of 1 per cent of its employees. There were gains in payroll totals in nine of the twelve groups of from 22 per cent in the vehicles group to 3.56 per cent in the textile group. The paper and printing and food groups show small losses, while the tobacco group showed a decline of 6 per cent in employees' earnings.

All but seven of the fifty-two separate industries included augmented the number of their employees in February, the increases generally being substantial ones. The seven industries representing decreased employment were led by the slaughtering and meat packing groups, with a decrease of 5.1 per cent, a fairly large decrease being usual in this industry at this season.

New Gypsum Block Machine

One of the most complete machines invented for the manufacture of gypsum building blocks has been patented by a Los Angeles inventor, J. F. Caldwell, according to William Smith, a manufacturer of Pasadena, California, who is financing the invention.

Each machine now turns out 24 feet of the blocks at each operation, requiring the services of only one man to four machines. Four minutes only are required to mix and fill four machines with a combined turnout of 98 feet of blocks. According to Mr. Caldwell, 12 of these machines will make 10,000 feet of blocks a day with a crew of from 12 to 14 men. Under the old method 50 laborers were necessary to accomplish the same work. Approximately 75 per cent of the partitions of the larger buildings constructed in Los Angeles during the last year and a half used this type of block.

A $50,000 plant has been built to manufacture these blocks on a large scale.

Record Rail Traffic Handled This Year

The railroads of the country have handled thus far this year a volume of freight traffic even in excess of the amount that had been expected, but in the face of this increase they have been able to maintain their equipment in good shape and keep their store of surplus rolling stock and power units intact for still greater efforts.

This was the achievement disclosed for the consideration of the board of directors of the American Railway Association at their regular meeting at the Yale Club in New York.

The reports submitted to the directors showed that in the ten weeks from January 1 to March 7, 1925, a total of 9,000,328 cars of freight had been handled, a figure three-tenths of 1 per cent above the estimate for this period, and 144,858 cars, or 1.6 per cent, above the same period of last year, the previous high record.

The bulk of the increase so far this year, as compared with last year, has come principally from manufactured products or commodities used by the manufacturing industry. Because the bulk of agricultural products moved last Fall and early in the Winter, there was a decrease in the number of cars loaded with these commodities.

Owing to the heavier loading of freight, the report of the car service division of the American Railway Association shows 279,430 surplus freight cars as of March 7, a decrease of 5,585 from February 28.

Surplus coal cars numbered 138,045, a decrease of 380, and surplus box cars 98,315, a decrease of 4,862. There were 21,580 surplus stock cars, an increase of 326, while idle refrigerator cars numbered 13,061, a decrease of 33.

New Incorporations

Arista Sales Company of New England has been incorporated for $60,000 to manufacture cement products, by O. Scherbener, C. K. Sanborn, Jr., D. M. Miller (Attorney F. E. Hamilton, 61 Broadway).

Plainfield Concrete Block Company of Plainfield, N. J., has been incorporated for $5,000 by Luigi Dilonardo, Gene Bussecco and Rosie Bussecco of Plainfield.

Columbus Concrete Products Works of Columbus, Texas, was recently incorporated for $7,000 by L. E. Paulson, George Becker and H. A. Spindler.

Northwest Lime Company, Seattle, Washington, has been incorporated for $250,000 by D. L. Evans, Lawrence Keefe and C. E. Glendennez.

The Tuscarawas Sand and Gravel Company of Akron, Ohio, has been incorporated for $500 by Charles L. Wilcox.

The Reinhart Concrete Block Company, Fort Thomas, Kentucky, has been incorporated by Aloysius V. Reinhart, H. Warren Hartesty and Brent Spence.

Portland Crushed Rock Company, has been organized at Portland, Maine, capital stock no par value, to quarry, crush, manufacture, prepare and deal in rock, stones, gravel, etc. President, Charles M. Drummond; R. B. Buzzell, treasurer; Wadleigh B. Drummond, clerk; all of Portland.

Indiana Stone and Supply Company, Michigan City, Indiana, has been incorporated for $15,000 to quarry stone. Directors: Schuyler Powell, John Hafold Powell and Ada L. Cline.

Woodhaven Sand Company, Inc., Jamaica, New York, has been incorporated for $25,000 to deal in gravel, sand, etc. Directors: A. P. Meniz and M. P. Meniz, Woodhaven, and A. M. Starcke of Brooklyn.

Lillington Sand and Gravel Corporation, Lillington, North Carolina, has been incorporated with 3,000 shares of no par value stock, and 300 shares subscribed by Phil H. McGuire and M. A. Campbell.

A large $100,000 gravel works is to be built shortly in gravel lands near Coyote, 12 miles south of San Jose, California, by William H. Forde, owner of the gravel works at Niles. Mr. Forde expects to install $100,000 worth of machinery and equipment, and to ship to all points in Northern California.

The Greenville Gravel Company has purchased 200 acres of land in southern part of Columbus, Ohio, and will establish a large modern washing, screening and crushing plant with tipples costing $200,000.

The Alfred Sand and Gravel Corporation of Hornell, New York, is preparing to build the plant structures at each end of the pit. An immense storage and loading structure about 90 feet high and 200 feet by 400 feet in size. This will be connected with the building at the other pit by a wire rope suspension bridge 1,800 feet long, crossing the railroad and the two highways and supported by nine towers. This will carry buckets capable of transporting a ton each from the pit to the storage house. A one-ton shovel will be used also.

The Far West Clay Company plant at Clay City, Washington, has been reconditioned and a new corporation, using the old company name, has been organized to operate it.

The Warsaw Gravel Company has been organized by citizens of Jefferson City, Missouri, to build and operate a plant at Warsaw, Benton County. It is being incorporated for $80,000,000 equal shares to be owned by C. W. Thomas, F. E. Ross, H. B. Church, Jr., and Hugh Stephens.

The Farragut Marble Company of Knoxville, Tennessee, is being incorporated for $200,000 by S. A. Rodgers, John N. Brennels, Floyd E. Haun, John M. Thornburg and others. The company owns a lease of 140 acres of marble lands on the Tennessee River 15 miles from Knoxville.

The Chief OKemos Gravel Company of Lansing, Michigan, has been incorporated for $30,000 to operate on the Rabey farm, east of East Lansing. Organizers are: Victor S. Saier, E. H. Clark, A. E. Foster, Peter Spanos, John Otto, John W. Tracy, C. E. Stabler, T. A. Lawler, A. J. Edwards, D. D. Creyts and Angel Priggooris.

The Yosemite Portland Cement Company of Fresno, has been incorporated with A. Emory Wishon, Vice-President and general manager of the San Joaquin Light and Power Corporation as president, and W. A. Sutherland of the Pacific-Southwest Bank and Murray Bourne of the San Joaquin Power are directors.

The Phoenix Plaster Company, a new gypsum plant, has been established in the southeastern part of the city to exploit a deposit of Alabaster Gypsum near Feldman.

Increased Production and Call

Marked Spring Activity Reported; River Traffic Heavy Shown by Pittsburgh Federal Engineers' Market Prices

By Our Pittsburgh Correspondent

THE SPRING season has given impetus to increasing operations in the sand and gravel industry at Pittsburgh, Pa., and vicinity, and the general curtailment brought about by unfavorable weather conditions in recent weeks has given place to marked activity in the production end, with rivers in condition for traffic. The coming weeks are expected to develop operations at a normal status among the leading producers, who are making ready with barges and steamers for anticipated business.

There has been marked interest devoted to river fleets during the past few weeks, covering both repairs to vessels and the construction of new barges, and all shipyards of this character are running under full capacity. Likewise there has been considerable equipment purchased in the line of engines, boilers and auxiliary apparatus for installation in existing vessels, replacing worn-out apparatus. Thousands of dollars have been expended in this direction, and the business going forward now in this same line is decidedly encouraging. At the same time, it gives an indication as to what the producers expect to accomplish during the early months to come.

Pittsburgh Federal engineers have issued a report showing river traffic during the month of February. On the Alleheny River, a total of 24,225 tons of sand were hauled, and 19,950 tons of gravel. The Monongahela River produced a gross tonnage of 33,050 tons of gravel, and 38,475 tons of sand. The Ohio River has a record this month of 26,094 tons of gravel, and 44,919 tons of sand.

There is no change worth recording in the local market, excepting, if anything, the increase in call for stocks, which has taken a rebound to more normal levels during March. Incoming orders are fairly satisfactory, while inquiries for future deliveries are likewise encouraging. The leading producers are giving attention to reserves, which have been depleted in recent weeks, and it is expected to replenish stocks at an early date.

Prices hold to established levels with only fractional changes in minor instances. The best grade of river gravel holds at $1.15 to $1.20 a ton at the yard hoists, both 1½ and ¾-inch stocks, wholesale. Dealers are allowed the regular 10 per cent discount from these quotations. Material loaded on trucks is selling at $1.50 and $1.60, wholesale. The local building supply dealers are asking around $2.50, delivered. In the line of river sand, the level is at $1.10 to $1.20 a ton at yards, with loaded material at $1.40 to $1.50, wholesale account. As in the case of gravel, dealers are allowed 10 per cent reduction from these figures.

Crushed stone holds without change at $2.85 a cubic yard, both 1½ and ¾-inch selections, carload lots. Wholesale, Portland cement continues at $2.29 a barrel, without bags to contractors and dealers, with customary cash discount. The call for the last noted material is on the increase, and a good business is expected to ensue as soon as spring weather is well established.

One of the most important announcements of the month in the trade at Pittsburgh, was the purchase by J. K. Davison & Brothers of that city, of the property, equipment and business of the Valley Sand & Supply Co., operating at Parnassus, Pa., and vicinity. The company has been in existence for several years, and has been prominent on the Allegheny River, operating three sand-diggers on this stream. The Davison organization plans for general expansion in this locality and expects to develop a large output during the coming season. To provide for this increase and acquisition, a new corporation has been formed under the name of J. K. Davison & Brother, Inc.

Pittsburg Coal Producers Ask for Hearing on Freight Rates

The Pittsburgh Coal Producers' Association has filed the first petition with the Interstate Commerce Commission for a hearing under the general freight rate investigation order by the commission. The association asks that the financial conditions of mine production and other factors be considered in fixing coal rates from points in Pennsylvania, West Virginia, Kentucky, Tennessee and Virginia. Formal complaint against existing rates is now under advisement by the commission.

East Showing More Interest

The Demand for New Structures and Other Calls Are Awakening Demand for Building Materials. Prices for Materials in the Various Districts

By Our Eastern Correspondent

WITH THE ADVENT of the spring season, there is developing more marked interest and a general awakening in the construction industry at New York and vicinity, brought about by a natural demand for new structures of various classes, as well as necessary improvement work. Up to the present time the extent of operations, both current and advance projects, is not up to the mark of a year ago, and the call for materials, including sand, gravel and crushed stone, holds at a lower status, consequently, than is to be generally expected at this time of year.

The situation, however, has its favorable aspects and while producers realize that competition is sure to be keener in a seller's market yet the trend will be beneficial in holding costs of commodities, as well as labor, at present levels. The past month has brought about particular stability, and a lesser call for stocks has not had the effect of lowering price schedules. In other words, producers can proceed with spring production at their pits and quarries under a definite knowledge of just what the market will bring, and can figure costs and profits accordingly. Such declines as may come are likely to be only fractional.

The decreasing volume of construction activities are shown plainly by the fact that February contract awards aggregated less than half of the totals for the preceding month in New York and Northern New Jersey, or approximately $40,000,000. During March, the weekly awards have been maturing at a better average, indicating that the gross for this month will be of advancing extent; the weekly figures are from $12,000,000 to $14,000,000, actual contracts placed, while contemplated work for April and May rounds to more than $250,000,000, throughout the eastern districts.

Excepting for riggers and derrickmen, a uniform condition exists between employers and employees which is quite satisfactory. The strike of riggers and derrickmen bids fair to continue for a number of weeks; meantime, stone work on a score or more of important projects is being held up, interfering with progress in other lines. In the pit and quarry field in New York and New Jersey districts, producers are apparently satisfied, for there are plenty of men, with wage scales ranging from 45 to 60 cents an hour, according to locality. Skilled help, likewise, is quite easy to procure, and there is every indication that operations will be enabled to go forward as desired during the spring season.

The general market shows no decided change in this section. With a lessened demand for stocks, there has been less material coming into the supply yards, and dealers have curtailed orders for immediate deliveries proportionately. Business which looms ahead, however, is destined to make a different condition prevail in the early weeks to come, for inquiries are on the increase for sand and gravel, and stocks will necessarily have to be replenished at an early date. Producers are apparently aware of this situation and are arranging reserves accordingly. Crushed stone, also, is coming into call for road construction operations, and quarries are either booking, or expect to book for large outputs before the turn of many weeks.

Good washed sand holds to the figure of $1.25 a cubic yard in the New York market, a figure which was current at this same time a year ago. There is a fair amount of stock on hand at the present time, and the Cow Bay and New Jersey producing centers are ready to fill any normal requirements in addition at short notice. Building supply dealers continue to quote at $2 a cubic yard, retail, delivered on the job, and report a growing call for the commodity.

Best washed gravel is selling in the wholesale market at $1.75 a cubic yard, both 1½ and ¾-inch stocks, a level established a month ago for cargo lot orders, as against a previous rate of $2. This figure seems to be a fair basis for current sales, and will likely maintain through the spring season. Building material yards have raised their rate from $2.90 to $3 a cubic yard for retail deliveries within established zones, said to be due to the increased costs of handling and re-handling stocks. Only ordinary business prevails at this time, with indications of better call within a very few weeks.

Crushed stone maintains at a figure of $1.75 a cubic yard in wholesale lots, both 1½ and ¾-inch stocks, and is operating under a quickening demand, owing primarily to spring road construction. Quarries in this district are making preparations for a large output, and a number of plants have recently arranged for increased working forces. Building supply yards are asking $3 a cubic yard for broken stone in retail lots, delivered, and are doing a fair business at this figure, the same for both standard sizes, noted above.

The Portland cement call has been advancing during the weeks of March and dealers report far more satisfactory future account. The demand for stocks can be taken as a fair barometer of the advancing trend for other basic commodities, bidding favorably for general spring construction operations. There is no change in price levels; alongside dock at New York, dealers are paying $2.15 a barrel in carload shipments, less bags, with customary cash discount. Delivered to supply yards, or to contractors at specified destinations, the figure holds at $2.55 and $2.60 a barrel, same terms. New York dealers are quoting at the well-established figure of $3 a barrel, with 10-cent bag rebate, delivered within the regular haulage zones. There has been no change in the mill base in the different important producing centers in this territory during the past month; in the Lehigh Valley section, the plants are asking $1.95 a barrel; in the Hudson, N. Y., district, the figure is $2.05; Fordwick, Va., maintains at the last noted figure; while the Universal Portland Cement Co., at Universal, Pa., quotes $1.95 at the mill.

There is no change worth recording in the New England section. Building operations are enjoying a noticeable increase with the beginning of spring, particularly in the line of industrial operations, and local contracting interests report an increased volume of plans out for figures. Commodity prices hold uniform, with demand advancing. In the Boston section, good washed gravel is priced at $1.50 a ton, both 1½ and ¾-inch stocks, wholesale. Sand is holding at $1 a ton in cargo shipments, as against a previous figure of $1.10. Crushed stone shows no change from a $1.60 per ton level, 1½ and ¾-inch sizes, wholesale, and is coming more prominently into call at this writing. Portland cement, wholesale, has again declined from $2.60, a recently established figure, to $2.55 a barrel, without bags. Dealers are holding to a $3.40 a barrel figure for truck-load orders, delivered.

The General Crushed Stone Co., LeRoy, N. Y., has acquired the plant and property of the Geneva Limestone Co., Oakes Corners, N. Y., in this same district, and will operate as a branch plant. This purchase gives the company a total of eleven plants, of which four are in New York, five in Pennsylvania, one in Massachusetts and one in Delaware.

Winter Building Shows Increase in 1924

The volume of building dropped during February to the lowest point in three years, according to statistics compiled by the Associated General Contractors of America. The low volume mark is regarded as the result of severe weather, rather than as an indication of a curtailment of the large program prophesied for 1925. Additional strength for this opinion is found in the fact that the volume of contracts awarded during the winter months of 1924-25 exceeded the figure set by the corresponding period one year before.

As no significant change is noticeable in material or labor conditions, no radical variation of costs is anticipated during the coming season. Only an unexpected curtailment of the amount of work which the industry assumes will be undertaken during the next six months would produce a marked reduction of costs, it is stated.

The total volume of contracts awarded during November, December and January exceeded by eight per cent the amount awarded during the same three months a year before.

Wages showed no change in February, remaining at a position slightly above that shown for the closing months of 1924.

Concrete surface pavement awards in January reached a total of 4,500,000 square yards. This is 500,000 square yards more than were awarded a year ago.

Lime-Brick Convention—1926

The 1926 Convention of the Sand-Lime Brick Association will be held in New Orleans, according to Otto Schwartz, president of the American Brick Company of New Orleans.

Big Expansion In Cement

Many Considerable Additions Being Made to Cement Mills. Supreme Court Decides Old Cement Power Case

By Our Special Correspondent

BRIGHT conditions prevail among the cement producers in the Lehigh Valley section of Pennsylvania at the close of the first quarter of 1925. Following two months of rather severe winter weather, retarding operations and shipments, the month of March has righted conditions to a marked extent. The weather has been favorable to production and distribution, and the mills are catching up with their schedules. Moreover, a decrease in call from important consuming centers has helped the producing end, giving plants an opportunity to curtail temporarily for repairs and betterments to equipment and buildings for the spring manufacturing season.

The advent of spring shows good orders on the books of the majority of the mills, sufficient to insure continuous production for some for many weeks. Moreover, the inquiries for carload orders for delivery in April and May are growing more and more numerous, and it is likely that leading interests will be sold to capacity at an early date. This is leading to general expansion in this section, and announcements are expected to be forthcoming in the near future of a number of important projects of this character. The Lehigh Portland Cement Co., has arranged to take over a plant soon to be built, as noted below, heading the list of expansion activities.

The Lehigh cement mills, for the most part, have accomplished their contemplated improvement programs, and have resumed production in practically all departments. Those plants not so far advanced in this line, are pushing the work to maximum extent in order to start up at the earliest possible moment. Large shipments of machinery and parts have been moving into the district, as well as other general equipment to bring about greater efficiency in operation.

The labor situation is satisfactory to the mills, which are now arranging their working quotas for immediate forthcoming operations. There is a good supply of men, brought about in part through curtailment in other lines in this vicinity.

The Pennsylvania State Supreme Court has handed down an important decision in a case of long standing brought by a number of the leading cement companies against the State Public Service Commission, protesting its decision in allowing the power company serving the Lehigh Valley district, then known as the Lehigh Navigation Electric Co. (now the Pennsylvania Power & Light Co.) to advance its rates for power at the mills. The decision is against the cement companies, and whether or not it will be contested further in a higher court is still to be determined. The case was started in 1920 by the Alpha Portland Cement Co., and other companies at Nazareth, Coplay and vicinity, and has been referred to in previous issues of PIT AND QUARRY. The companies have been paying the increased power rate since this time, and it is currently estimated that close to $1,000,000, in excess charged, is now involved in the suit, for which the companies have asked an accounting, in addition to lower rates. Since the action was started, the Alpha company has withdrawn as a power consumer of the company and is now operating its own generating station at the Martin's Creek mill, utilizing waste heat from the boilers. It is not involved, therefore, quite so seriously as some of the other contesting cement interests.

The Atlas Portland Cement Co., is maintaining regular production at its large mills at Northampton, Pa., giving employment to a full working force. The company has booked heavy orders and sizable shipments are leaving the plant. At a recent meeting of the Board of Directors the company's outstanding capital was trebled, and the stock rating changed from $100, par value, as now, to stock of no par value; three shares of the new stock will be issued for every one share of common stock now outstanding. At the same time, the authorized preferred stock of the company will be reduced from $3,000,000 to $2,500,000.

The Lehigh Portland Cement Co., Allentown, Pa., has closed negotiations for a lease of the plants of the Bath Portland Cement Co., and has taken over the main existing mill of the company near Bath, Pa., under the leasing arrangement. The Lehigh Company will continue the plant as a new branch mill, at maximum capacity, a rated output of

3,400 bbls. per day. The company has also acquired the new mill of the Bath organization to be erected at Sandts Eddy on the Delaware River, near Easton, Pa., on which construction has recently been started. The entire project is under the direction of the Public Service Production Co., Newark, N. J., which has acted as engineer and general contractor for the mill, including the purchase of all equipment. The plant will consist of a number of units with power house and auxiliary structures, with an output of about 1,000,000 bbls. per year. It is estimated to cost approximately $1,500,000, and will be ready in the fall. These acquisitions will give the Lehigh Company a total of eighteen mills in all parts of the country, increasing its gross output approximately 2,000,000 bbls. per annum.

The Giant Portland Cement Co., has resumed operations at a portion of its Reliance mill at Egypt, Pa., following general improvements and over-hauling. The company has booked heavy orders and expects to run full capacity indefinitely.

Production is advancing at various mills in the Lehigh Valley section, including the Coplay Cement Mfg. Co., at Coplay, which is running at its Mill B, and other units; Hercules Portland Cement Co., at Hercules; Whitehall Cement Mfg. Co., at Cementon; Lawrence Portland Cement Co., at Siegfried, and the Dexter Portland Cement Co., at Nazareth. The Nazareth Cement Co., at the last noted location, is also busy.

The Yosemite Portland Cement Co., Merced, Calif., recently formed to construct and operate a mill in this section, has been acquired by new interests, prominently identified with the San Joaquin Light & Power Corporation, Fresno, Calif. The company has been reorganized with new officials, with capitalization of $1,500,000. They plan for a mill to operate under the wet process, with a capacity of about 2,000 bbls. per day, to cost in excess of $900,000, including machinery.

Mr. J. M. Heaton of 428 Fisk Building, 1767 Broadway, New York, formerly branch manager for greater New York, has been appointed distributor for the complete line of Lapeer Semi-Trailers. Mr. Heaton will have greater New York for his territory.

Nation's Building Near 1924 Total

Building contracts awarded during the first two months of 1925 showed a decline of only one-half of one per cent under the first two months of 1924, totalling $595,653,000, according to F. W. Dodge Corporation. February awards totaled $299,260,000, a figure slightly under that for February, 1924, and less than one per cent over that for January, 1925. There was a decided falling off in New York state and Northern New Jersey, a slight decrease in the Northwest, a slight increase in the Central West, and substantial increases in the New England, Pittsburgh and Southeast districts. Public works and other utility contracts increased considerably, taking up the slack in other classes of construction.

Statistics of contemplated work reported in February show a wide divergence. Dodge reports a total of $666,700,060, an increase of 14 per cent over January and of 32 per cent over February, 1924. S. W. Straus & Co. report that the whole country was within 7 per cent of the record established in February, 1924, and 16 per cent ahead of January, 1925. Dun's reports a decrease of 14.1 per cent under February, 1924, and a gain of 14.2 per cent over January, 1925. Detailed statistics of E. W. Dodge follow:

	Total	% change over 1924	% change over Jan. 1925
Thirty-six States			
Awards	$299,260,000	—	+ 1
Permits	666,700,600	+32	+ 4
2 mos. awards.	595,653,000	—½	—
N. Y. & No. N. Jersey			
Awards	63,581,300	—41	—43
Permits	154,847,600	—	+ 7
2 mos. awards.	174,352,200	—18	—
New England			
Awards	24,258,600	+37	....
Permits	54,501,100	+	+
2 mos. awards.	48,458,700	+22	—
Middle Atlantic States			
Awards	33,531,400	+25	+55
Permits	88,343,800	—	....
2 mos. awards.	55,209,100	— 9	—
Southeastern States			
Awards	46,678,400	+15	+14
Permits	112,879,500	+	+
2 mos. awards.	87,704,100	+ 8	—
Pittsburgh District			
Awards	47,784,200	+36	+25
Permits	77,303,800	+63	— 6
2 mos. awards.	86,042,000	+42	—
Central West			
Awards	78,809,300	+19	+42
Permits	159,725,400	+17	— 9
2 mos. awards.	134,245,400	+ 1	—
Northwest			
Awards	4,616,800	—16	— 8
Permits	19,099,400	+	+
2 mos. awards.	9,641,500	— 1	—

Mechanical Goats

MOUNTAIN-CLIMBING goats are very common in the Alps, Rockies and other places, but a "mechanical goat" seems to have broken loose near Wilkes-Barre, Pa. We don't know whether or not we can get George Lee's goat by telling this story, but he certainly got one of Orton's goats when he bought his 0 & S Shovel and began stripping coal on the mountain top.

The story goes something like this, and there are plenty of witnesses and a few photographs to vouch for its truth. The George E. Lee Coal Company of Wilkes-Barre wanted to strip the overlay from a coal seam 3,000 feet up on a mountain, and the cost of special machinery seemed prohibitive so they decided to use their Model E Orton & Steinbrenner one-yard Shovel. The cost of dismantling, hauling the parts one mile up a mountain road and re-assembling also seemed high, so they decided to try driving the shovel up under its own power.

The road was hard, being cut largely through solid rock, but it was very crooked and quite narrow in places, so a survey was made and the trip started. From the accompanying photograph you will see that the crawler treads barely squeezed through in many places. The first thing to be done was to ford a creek at the bottom of the mountain, which was a good test of the running gear, and then the uphill climb began.

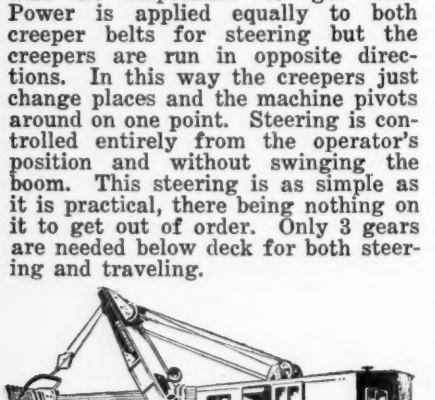
Some fear was expressed that the Climax Model "T" Engine used would not "make the grade," but the "goat" went right along, up grades as steep as 40 per cent in places, and reached the top without being stalled once. In fact, the engine ran cool and showed plenty of reserve power at all times. We are not told that "the goat went leaping from crag to crag," but it is enough to get anyone's goat to think what may happen if our machinery builders keep on improving their apparatus, and especially if the use of Climax Engines keeps spreading the way it has during the last three years. The Climax Engineering Company is now furnishing engines to nearly 70 per cent of the builders of heavy industrial machinery in this country.

The Mountain Climbing Shovel.

New Brownhoist Gas Shovel

AFTER studying for several years the needs of the various industries using power shovels, The Brown Hoisting Machinery Company has just announced a new half-yard capacity gas engine, creeper truck shovel-crane. The interesting features of this machine are its extreme simplicity and accessibility (there being only 18 gears on the entire machine), its pivot steering device and its fast operating speeds and quick convertiblility to dipper shovel or clamshell work.

The pivot steering on this No. 1 Brownhoist is entirely new and makes possible the working of this shovel in narrow quarters which would otherwise be impossible to get into. Power is applied equally to both creeper belts for steering but the creepers are run in opposite directions. In this way the creepers just change places and the machine pivots around on one point. Steering is controlled entirely from the operator's position and without swinging the boom. This steering is as simple as it is practical, there being nothing on it to get out of order. Only 3 gears are needed below deck for both steering and traveling.



The New Brownhoist Gas Shovel.

As stated above, extreme simplicity and accessibility is the keynote in the design of the No. 1 Brownhoist. The fact that there are only 18 gears on the machine enables them to be made larger in diameter and wider faced than is ordinary practice. The machine has exceptionally fast operating speeds as either a shovel or crane but all moving parts are slow running except the engine take-off gears. These latter are inclosed in a housing and run in oil. Because of this construction wear is reduced to a minimum and the No. 1 is quiet in operation.

A direct and independent dipper crowd is employed on the shovel which gives the operator a wider and more flexible range on shovel work. The crowding motion, which is of the rope type, is controlled by one lever, and is entirely independent of the dipper hoist. This feature permits the dipper to be crowded in or out even while digging.

The utility and worth of a convertible half-yard shovel-crane is most noticeable on small jobs and to road contractors who have use for cranes and shovels at different times but who do not wish to tie up considerable money in separate pieces of equipment for which they do not have use at the same time.

The Brown Hoisting Machinery Company of Clevelend, Ohio, has prepared a booklet on this machine showing it both as a shovel and crane which they will be glad to send to anyone interested.

Boiler Water Circulation

An interesting eight-page treatise dealing with the principles of boiler circulation has just been published by the Nuway Boiler and Engineering Co., 53 West Jackson Blvd., Chicago. This treatise discusses the importance of rapid circulation of boiler water, together with twelve reasons why rapid circulation is so important as a means of preventing priming, foaming, wet steam, etc. This treatise also contains an interesting table showing the sizes of chimneys required for various sizes of boilers. The various stages of development of the steam boiler from the tea kettle to the latest design for efficient heat transfer and circulation are illustrated and described in an interesting manner. The effect of smaller fire tubes, increased staggering and greater space between tubes upon the rate of flow is discussed; also the use of baffle and end plates in such manner as make the water velocity higher than by uncontrolled convection. This treatise will be of interest to all engineers and executives concerned with the operation and purchase of boilers.

Mr. W. S. Race has joined the Miller-Hurst Corporation, foundry and industrial engineers. Mr. Race was formerly with the United States Rubber Company, having worked in their New York and Detroit offices.

Improved Bay City Excavator

A new Bay City One-Man Excavator is announced, the New Model 4. This machine is not in reality a new model, but an improved model of the Bay City One-Man Excavator which has already attracted considerable attention. The Bay City Dredge Works claim the distinction of having brought out the first small one-man operated shovel several years ago, and the Model 4 now being announced incorporates the following improvements:

Convertibility. The new Model 4 can be changed from Shovel to Clamshell or Dragline in an hour's time without changing the Boom or the machinery arrangement.

The Shovel capacity is increased to ½ cubic yard. A heavier Dipper without bail is used, one which has a cast steel back.

It has Back and Pinion Cable operated crowd.

The Framework is of all steel.

It is equipped with Silent Chain Drive.

It has Bull-Wheel swing, of the same type as is used on the larger Bay City 16-B.

The Caterpillar treads are of increased length.

It has a Hercules Power Unit.

Its Ground Clearance is greater.

There are several hundred Bay City One-Man Excavators in service on jobs that do not warrant heavy, high-priced shovels. It is for such operations as these that the Bay City Model 4 machine is designed and, they say, found to serve to most practical advantage.

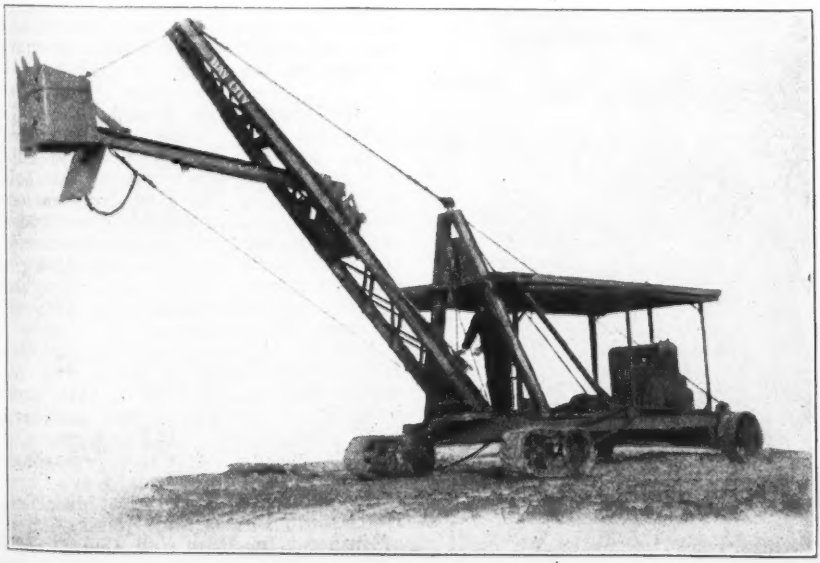
Taylor Chain Catalog

A new bulletin has been issued by S. G. Taylor Chain Company of Chicago is entitled *Information Concerning Manufacture and Lubrication of Steam Shovel Chain.*

The book describes Taylor Steam Shovel Chain, giving tables of sizes and weights, and illustrated with pictures showing the processes of manufacture, and in use on the job. There are testimonial letters of satisfied users and miscellaneous information on the use and care of steam shovel chain.

American Cable Appoints

With the opening of a district sales office at 160 N. La Salle St., Chicago, the American Cable Company announces the appointment of W. H. Slingluff to handle sales of the company's Tru-lay wire rope, Tru-loc fittings and other standard wire rope products in the midwestern states. Mr. Slingluff has been actively identified with the wire rope field for more than 26 years and is well known in both the production and selling divisions of the industry.



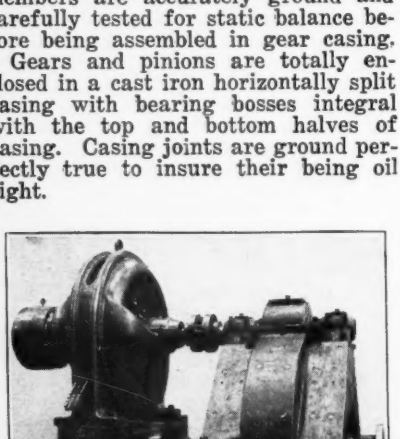
The New Bay City One-Man Excavator.

New Poole Reduction Gears

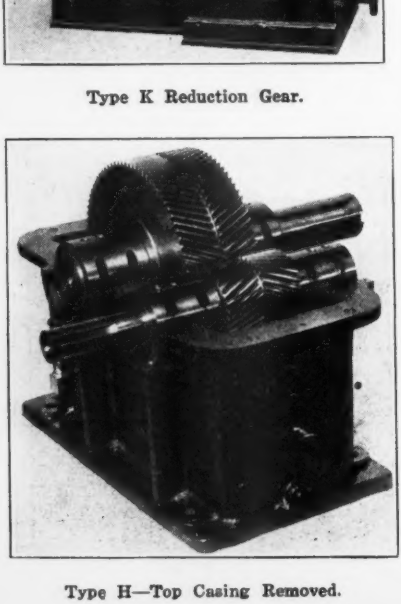
THE Poole Engineering & Machine Company has recently brought out two new types of reductions gears known as their type H and type K.

The type H reduction gear or speed transformer consists of a double helical or herringbone gear made of special analysis open hearth steel forging and a herringbone pinion cut integral with high speed shaft made of chrome vanadium steel. Both gear members are heat treated to proper hardness to minimize wear. Gear members are accurately ground and carefully tested for static balance before being assembled in gear casing.

Gears and pinions are totally enclosed in a cast iron horizontally split casing with bearing bosses integral with the top and bottom halves of casing. Casing joints are ground perfectly true to insure their being oil tight.



Type K Reduction Gear.



Type H—Top Casing Removed.

The bearings are removable, consisting of cast iron shells lined with genuine babbitted metal and are supported in bosses integral with top and bottom halves of casing insuring accurate and permanent alignment.

For low speed drives thorough lubrication is obtained by an improved splash and gravity system in which the gear dips in the oil sufficiently to carry oil to a reservoir in the upper casing from which it feeds to all bearings and directly between the gear teeth at the line of contact.

For turbine and other high speed drives an oil pump and cooler is provided, thus insuring cool oil under pressure to the bearings and gear teeth.

The type K reduction gear consists of double helical or herringbone forged steel pinion integral with shaft and a cast steel double helical spur gear. Both gear and pinion have cut stub teeth. The gear and pinion shafts are mounted in substantial babbitted bearings of the ring oiling type and the gear and pinion are lubricated by the splash system; the gear and pinion running in an oil tight oil filled case.

The high speed shaft or driving pinion in the type K gear is located in the top of the casing and the driven shaft is directly under the pinion shaft and just below or near the floor line which makes it especially desirable for certain types of machines used in industries where the line shaft is close to the floor.

Heil Sprinklers, Dump Bodies

Several new types of sprinkler tanks, garbage bodies, ash and rubbish bodies are described in new bulletins issued by The Heil Corporation, Milwaukee. Remarkable economies that can be secured through the use of the Heil Sprinkler tank are brought out in a mimeographed letter received by this company from the City of Spooner, Wisconsin.

Bulletin Number 146 is entitled Heil Street Sprinkler Tank and describes the construction of this tank, built for mounting on the standard Ford truck chassis. It has a capacity of 500 gallons of water. Garbage bodies are also described.

Bulletin Number 145 describes Heil Dump Bodies and Hoists, and is of interest to State and County officials who have trucks to equip, also to many cities.

American Cable Company Develops New Wire Rope for Quarry Use

OF INTEREST to quarrymen is the announcement by the American Cable Company of a new wire rope, known as Tru-lay, embodying in its construction a basic improvement over previous methods of manufacture.

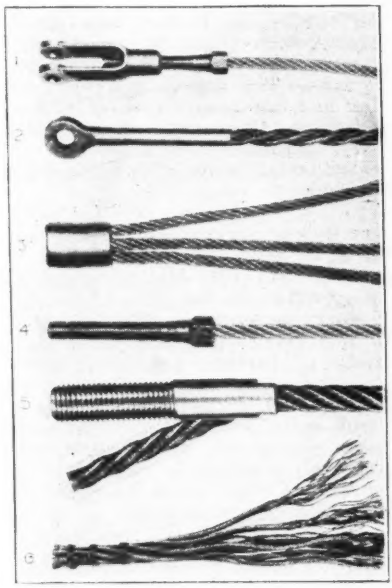
The new principle developed in the making of the rope is the performing of wires and strands to the exact shape they must have to fit correctly in the completed product. The rope is being made in Lang and regular lays up to one inch in diameter and engineers concerned with its development for mining purposes express satisfaction with its performance under exacting and strenuous tests.

An important characteristic of the Tru-lay rope is that it resists unstranding. It can be cut at any point for splicing and otherwise handled without the necessity of sizing. Exhaustive tests show that it has considerably longer life than ordinary rope under reversed bending stresses —an important asset where winding over sheaves and drums is a chief cause of wear.

The performing of the wires and strands in the rope results in evenly balancing the load on individual strands and in a remarkably uniform load distribution to single wires. The rope shows no tendency to high strand in actual use and has stood up satisfactorily in winding tests under heavy loads.

Broken wires in this new rope lie flat. Outer wires on cables, broken by long wear or abrasion, cause considerable trouble, and often necessitate the removal of the rope before it should actually be discarded. The outer wires of the Tru-lay rope show no tendency to fray out of the rope body. They continue in their places, thus lessening the wear on other wires and on sheaves and drums.

From the standpoint of safety, industrial engineers who have used Tru-lay rope are particularly commendatory. The fact that the rope does not unstrand makes splicing a comparatively simple operation. Rope users have long known that Lang-lay rope has advantages over regular lay for certain sheave and drum work. While 80 per cent of mine cable used in England and Europe is Lang-lay, it has been little used in the United States because of difficulties in splicing and handling. The performed principle in Tru-lay rope is designed to meet this difficulty, making use of Lang-lay rope possible wherever desired.



1. Tru-lay rope with a threaded hexagon Tru-loc fitting permitting the application of shackle as shown, or turnbuckles, rods, etc.

2. Flat head eye and fitted directly to Tru-lay rope.

3. Example of a multiple rope Tru-loc fitting. Any reasonable number of Tru-lay ropes can be fitted in this fashion.

4. Hexagon Tru-loc fitting which makes wire rope as adaptable to various uses as rods.

5. Steel Tru-loc fitting split open to show how metal grips strands and wires in the rope. Better equalization of load on wires and strands is made possible through the use of this type of fitting.

6. How an ordinary wire rope unstrands when cut.

To make available practically the entire strength of the new rope, the American Cable Company has developed for it a special steel fitting,

without zinc, called Tru-loc. The Tru-loc fitting has not only proved dependable under ordinary conditions but also permits the use of turnbuckles, shackles and other equipment used with rods and chains.

A steel sleeve is slipped over the smooth unseized end of the rope, placing in a specially designed press, and made to "flow" down upon the rope until it grips wires and strands. These sleeves may be of any reasonable length—can be threaded, can be equipped with heads of various types for wrenches, or furnished with eyes or hooks. The fitting is lighter, less bulky and has been found to be more dependable than the old-style zinc socket, probably because of the greater equalization of load on wires and strands.

Tru-lay rope is designed for use in every industry where dependable wire rope is a factor. It is now being introduced into the Mid-continent oil drilling fields, in the general building and construction field, in the cement and quarrying field and in a large variety of factory and shop operations, including elevator and crane operation. In smaller sizes it is considered satisfactory for airplane and airship equipment, and is now used extensively with special fittings in the rigging of Coast Patrol Boats for the United States government.

Another Gayco Separator Shipped To Canadian Mines Department

The Rubert M. Gay Company, Inc., has just shipped a second Gayco Separator to the Department of Mines, Ottawa, Canada, for use in the new testing laboratory now being constructed.

The first Gayco bought by the department was a 30 in. machine and this proved so satisfactory for producing fine materials of many kinds that in designing a larger laboratory a standard 8 ft. separator was specified, so that problems could be worked out on a commercial scale.

As the Gayco can be adjusted to give absolutely uniform products from 80 mesh to 350 mesh, and as the sizing is particularly close and accurate this machine is admirably suited to the work.

In addition to providing materials of various degrees of fineness the Gayco Separators positively determine whether or not difficult materials can be dry separated. If they are separable the Gayco will handle them.

New Wire Cloth Catalogue

A new 64-page catalogue, Number 25, has just been published by the Newark Wire Cloth Company, 351-365 Verona Avenue, Newark, New Jersey. The catalogue includes complete information with the list prices on double crimped heavy steel wire screens; regular coal screens; steel wire cloth; bran duster grade of cloth; tinned mill screen cloth; brass, copper and bronze wire cloth; market grade brass and copper wire cloth; and extra fine phosphor bronze wire cloth. It also illustrates several grades and explains in detail the Newark Metallic Filter Cloth which was originated and developed by the Newark Wire Cloth Company and which is now used all over the world. The catalogue goes into the uses of monel metal in considerable detail on two pages, giving a list of sizes of monel metal wire cloth carried in stock. Five pages are devoted to new U. S. Standard Testing Sieves in whose manufacture this company were the pioneers. A graph showing the relation between the U. S. Standard and other standards is included as well as price lists of U. S. Standard Sieves and "market grade" testing sieves. Foundry riddles and dipping baskets are included. Five pages in the back are devoted to tables such as are needed by users of wire cloth. Many photographs are shown to illustrate the multitude of weaves, spaces and combinations used in the manufacture of wire cloth, the largest shown being 1 inch by 1 inch and the finest a twill weave 325 meshes to the inch, the diameter of the wire being .0014 inch and the opening .0017. In the forepart of the catalogue a photograph of the new factory is shown and a number of pages are devoted to pointers on selecting, ordering and examining of wire cloth. All regular users of wire cloth and all who may have need of it in the future should have a copy of this handy and valuable catalogue on file.

N. P. Nelson Works Removal

Announcement is made by the N. P. Nelson Iron Works of Brooklyn, New York, of the removal of this concern, on March 1, 1925, to their new factory at Bloomfield Avenue and Erie Railroad (Allwood Station) Passaic, New Jersey. With their larger plant and better facilities they will be in a better position to give prompt service and quick deliveries of Nelson Truck Loaders.

Chicago Pneumatic Air Compressor Driven By Direct Connected Fly-Wheel Motors

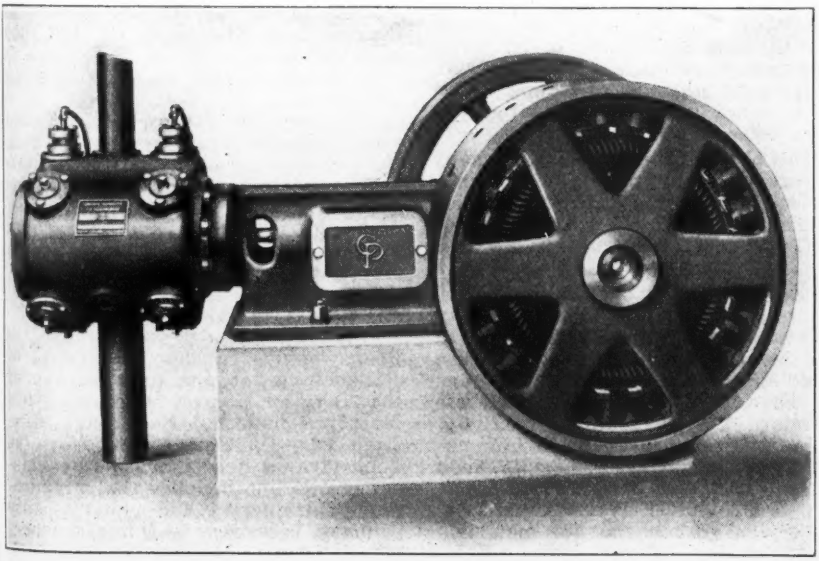
THE splendid performance results that have attended the application of the direct connected, synchronous motor to air compressors of the larger capacities, have stirred motor manufacturers to unusual activity in developing synchronous motors suitable for driving compressors of smaller size.

Until very recently the high, first cost of the small direct connected motor placed it at a great disadvantage in competing with belted induction motors. This handicap was largely due to the weight per horsepower of the synchronous motor, which ascended very rapidly in the smaller sizes.

The general standard construction of synchronous motors necessitates large diameters for slow speed ratings such as are encountered in air compressor operation. This is due to the fact that pole space must not be too crowded and that a certain amount of fly-wheel effect is required, which must, of necessity, be concentrated in the rotor, resulting in unusually heavy bearing pressures because of the weight necessary at a small radius to give the required effect, thus making the rotor unsuitable for mounting on an overhung shaft as in the case of a center crank compressor without outboard bearing.

In order to overcome the disadvantages of the present general construction there has been designed a line of synchronous motors known as the "Fly-Wheel Type" which are especially adapted to single straight line air compressor operation. This motor is designed with the rotating element outside the stator. The stator is mounted in a cradle support bolted to the compressor frame. This cradle support is bored concentric with the compressor bearing to assure perfect alignment of the stator and a uniform air gap when assembled. The rotor presents the appearance of an ordinary fly-wheel. Its face is crowned for driving an exciter or other auxiliary while on the inner surface of the rim are mounted the poles, adding fly-wheel effect, of which there is an abundance.

The air gap in this motor is relatively small and the question of maintaining a uniform gap naturally arises. This has been met by designing the stator so that the magnetic pull is upward, relieving the bearings of excessive downward pressure and giving, in effect, a floating rotor. In addition the main bearings of the



The Chicago Pneumatic Air Compressor.

compressor are fitted with removable die-cast bushings which may be quickly and cheaply replaced at the first sign of wear. With these precautions little trouble may be expected from the air gap source.

With such construction as that outlined above, the weight and consequently the cost of the motor have been greatly reduced; sufficient flywheel effect for steady, smooth operation has been obtained; a uniform, correct air gap has been secured; foundation expense has been reduced; and because of the simplicity of construction and the machined assembly parts, erection costs and repairs are reduced to a minimum. The floor space required to accommodate a machine so equipped is even less than if belted to a line shaft, and at least 30 to 75 per cent less than required for short belt motor drive, while the cost of the two types of electric drive are practically the same.

Chicago Pneumatic direct connected compressor units with this type motor are now available in sizes ranging from 139 to 1,000 cu. ft. displacement, for 100 pounds discharge pressure up to 125 pounds.

Jeffrey Bucket Elevators

Catalog Number 410, just issued by The Jeffrey Manufacturing Company of Columbus, Ohio, describes Jeffrey Standardized Bucket Elevators for service in power houses, coal yards, industrial plants, sand and gravel plants, quarries, cement mills, fertilizer plants, railroad coaling stations, cotton seed oil mills, and other industries where loose materials are to be elevated.

The book is illustrated with many engravings and plant blue prints, tables of sizes and capacities, which describe in detail the construction of Jeffrey Bucket Elevators.

Testimonials of users are given which indicate that Jeffrey Chain Elevators give long and faithful service without breaking down or repairs. In one instance no replacement had been made since 1902. Many installations are shown. The capacities of these Standard Elevators range from 6½ to 80 tons per hour; the size of material may vary from dust to 4½ inch cubes. They are designed as Stone, Coal and Ashes Elevators, these being typical of the class of materials for which the different types of elevators are adapted.

American Forged Pipe Flanges

The new catalog issued by the American Spiral Pipe Works of Chicago,—*Catalog Number 24*—describes fully but without superfluous words the Forged Steel Pipe Flanges, Forged Tubular Products, Seamless Rolled Steel Rings, and Corrugated Boiler Furnaces manufactured by this company. The reader will be interested in the exhaustive way in which the subject has been covered and the convenience of arrangement. There is no extraneous matter, yet nothing of practical value has been omitted.

The catalog answers the question, "How did a company originally organized to manufacture spiral riveted pipe, become the world's largest manufacturer of forged steel flanges?" Thus: "Twenty-five years ago we experienced great difficulty as a result of the breakage of cast iron flanges during the shipment and erection of our pipe. It was to overcome this difficulty that we perfected processes and equipment and built a modern plant for the manufacturer of forged steel flanges, not only for our own work, but for all high pressure piping."

Primarily this book is a handbook of valuable information for engineers, designers and operators of power systems. Formulas and data tables of vital information are so placed as to permit of quick and easy reference. It is among the first complete publications to embody the new American Engineering Standards of 400, 600 and 900 pounds W. S. P. There is also complete data covering existing standards.

The book is profusely illustrated with full-size cross sections which, with tables and some half tone illustrations, intelligently convey the best modern practice in the field of increasing pressures and superheat. There is also an interesting section on corrugated steel furnaces.

Pennsylvania Crusher Agents

Announcement is made by the Pennsylvania Crusher Company of Philadelphia of the appointment of the Stratton-Cahoon Company, 908 McIntyre building, Salt Lake City, Utah, as District Agents for the Pennsylvania line of crusher machinery. This line includes coal preparation machinery, and heavy duty primary, secondary and fine crushers for limestone, gypsum, cement rock and ores.

Allis Chalmers to Handle Edge Moor Foreign Sales

Edge Moor Iron Company, manufacturers of Edge Moor Water Tube Boilers, have arranged for the sale of Edge Moor Waste Heat Systems in Europe and South America through the Allis-Chalmers Manufacturing Company.

With their long experience as manufacturers of crushing and cement mill machinery and with their well established offices in Paris, London and Santiago, Chile, the Allis-Chalmers Manufacturing Company have made contacts with the cement mills of Europe and South America which afford friendly introduction for the Edge Moor Waste Heat System, and an exclusive representation has been granted them by the Edge Moor Iron Company for these countries. Also, due to the fact that their engineers at Paris, London and Santiago have been trained in this country and abroad and are thoroughly familiar with cement plant engineering and operation, the Allis Chalmers Manufacturing Company are well qualified to render excellent service to purchasers of the Edge Moor Waste Heat System both during negotiations and after the plant is installed and operating.

Now that the recovery of waste heat from rotary cement kilns has entirely passed the experimental stage and is recognized as an integral part of cement making equipment in the new, efficient plants and as an improvement necessary to enable old plants to meet competition, the addition of the Edge Moor Waste Heat System to its own machinery places the Allis-Chalmers Manufacturing Company in better position than ever to render a complete service to cement industry of Europe and South America.

All engineering and designs for installation of Waste Heat Recovery Systems will be prepared for the Allis Chalmers Manufacturing Company by the Edge Moor Iron Company, designers and builders of Edge Moor Water Tube Boilers and the Edge Moor Waste Heat System. These designs will be in accordance with the general plans and conditions under which the Edge Moor Iron Company has already made more than thirty successful installations of Waste Heat Recovery Systems in the United States, Japan, the Philippine Islands, Australia and South America. Already under the terms of this new arrangement between the Edge Moor Iron Company and the Allis-Chalmers Manufacturing Company two Edge Moor Waste Heat Systems have been sold, one for installation at Marseille, France, and one for installation near Barcelona, Spain.

Hill Hydraulic Rams

Two new catalogues issued by the Johnson Manufacturing Company formerly the Seattle Machine Works, of Seattle, Washington, **Catalog R-1** and **R-2**, describe the Hill Hydraulic Rams, "The Most Efficient Ram on the Market."

R-1 discusses the comfort, convenience and economy for farm, ranch and domestic use of Hill Hydraulic Rams. These Rams use the force or power by means of some head or fall that can be obtained with the water of any small stream, spring, flowing well or other supply to pump water anywhere needed.

R-2 is "A Reliable Handbook on Ram Hydraulics for Irrigation, Mining and Water Works." Hill Rams are said to be very well adapted for pumping water for mining operations, "the cheapest and most economical pumping installation" where water power is available. There is no fuel, power or attendant required, and hence no cost to operate.

U. S. Wealth Placed At $133,000,000,000

Joseph Walker & Sons, members of the New York Stock Exchange, have prepared an analysis and statistical record showing the growth of the United States, particularly from 1909 to 1924.

Fifteen years ago this firm, which was founded in 1855, completed an analysis indicative of the general wealth of the country from 1885 and 1909. This has now been brought down to 1924.

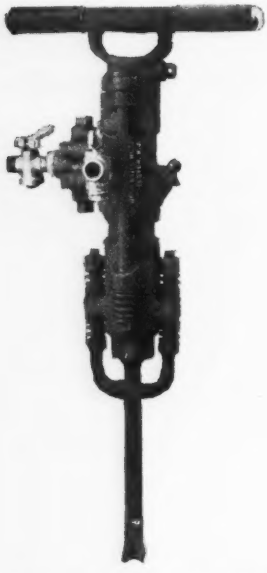
The summary includes growth in population, value of crops, mines, railroads, electricity, manufactures, shipping, banking, insurance, education and government finance.

The wealth of the country is placed at $133,000,000,000 as compared with $125,000,000,000 in 1909 and only $55,000,000,000 in 1885. The per capital wealth is put at $2,900 as compared with $1,400 in 1909 and $980 in 1885.

New Wood Hammer Drill

AN improved hammer drill with some new and novel features has been brought out by The Wood Drill Works of Patterson, N. J. Everything used in the construction of these drills is described as being the result of 35 years' experience in drill building. Recently in a test run against several prominent hammer drills, it drilled a 10' foot hole 14 inches ahead of the nearest competitor.

A very hard and rapid blow is obtained by the fact that the air that is admitted to the parts to operate the piston does not return through the same part but escapes the instant the piston has traveled its working distance.



The New Wood Hammer Drill.

The improved steel puller will stand all the strain a drill runner can exert on it. It has two springs on the top and two springs on the bottom, thus doing away with breakages. The hole cleaner is perfect in its operation. By turning the thumb nut the air blows the cuttings from the hole and when it is turned to the opening it stays there, giving the drill the full air pressure. This hole cleaner stays where it is put, they say.

Nest-O-Cone Screens

A folder just gotten out by the Pioneer Tractors of Winona, Minnesota, describes Nest-O-Cone patented screens for washing and separating of sand and gravel. Nest-O-Cone Nested-Frusto-Conical screens embody a new principle in separating and washing screen design, and were designed, developed and later patented by a practical commercial producer of sand and gravel.

Three primary features of NEST-O-CONE screens are cited as contributing toward increase in quantity of output without danger to quality. First, the removal of oversize and coarse aggregate at the beginning of the screening operation relieves the successive sections of the carrying of this material and it is therefore possible to feed at greater speed without covering too deeply the second and third screen sections. Second, the change of direction of flow of material as it passes through each screen section makes possible faster feeding without the danger of carry over. Third, the sand screen being on outside of assembly offers greatly increased screening area to finer material and this increase in area permits the proper separation and washing of sand and fine aggregate at higher speed than is possible with any other construction. An increase in the contact area of the screen is calculated to greatly increase the capacity of the entire unit.

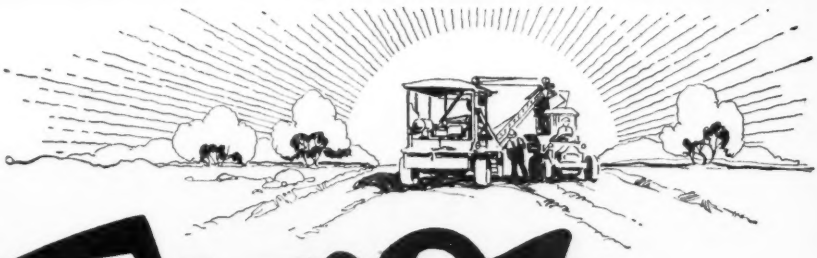
There are illustrations of the screen and a plant diagram.

Glass from Minnesota Sand

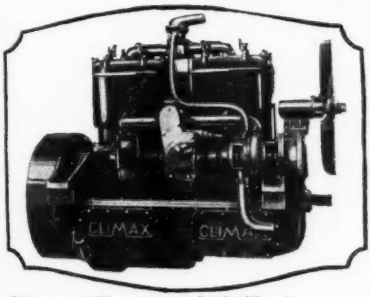
Samples of plate glass made from silica sand secured from out-croppings along the Mississippi River indicate that this white sand can successfully be used for glass making.

"I have a sample of the plate glass and it proves to be high grade," said George A. Tiel of the department of Geology and minerology, University of Minnesota. The glass had been tested in the laboratory of the Ford Motor Company. "Ford's test indicates the possibility of making glass from the sand in question, but undoubtedly cheap fuel would be required to work the deposits commercially."

The Ford Company is said already to have made arrangement to install gas producer equipment, indicating the company's intention to commence manufacture.



First on the Job in the morning and the last to quit at night



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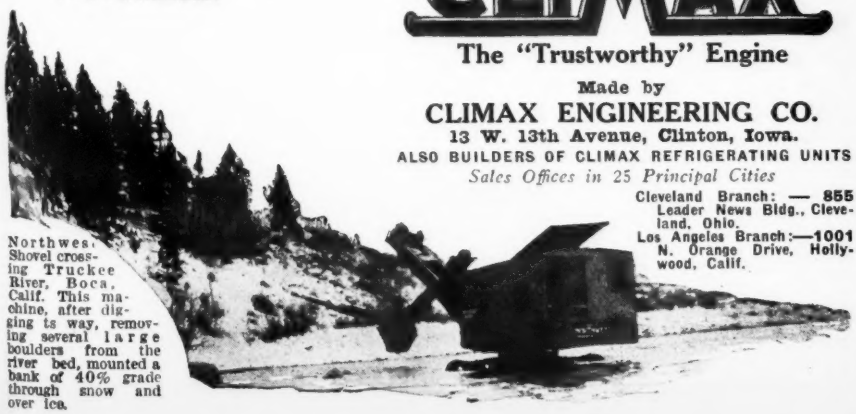

Northwest Shovel crossing Truckee River, Boca, Calif. This machine, after digging its way, removing several large boulders from the river bed, mounted a bank of 40% grade through snow and over ice.

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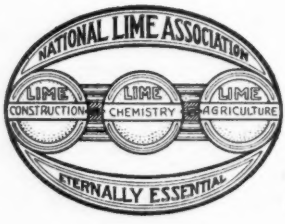
Seventh Annual Convention

BRIARCLIFF LODGE
at Briarcliff Manor, N. Y.
May 26, 27, 28, 29, 1925



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National Lime Association

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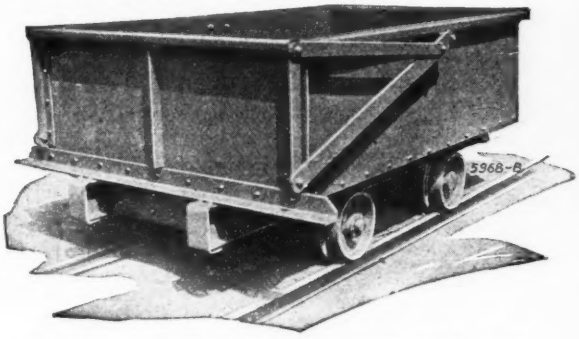

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4—Erie B. Shop Nos. 143, 466, 1064 and 1219, traction wheels, ¾-yd. dipper.
1—Model 21 Marion, caterpillar. Shop No. 4294, ¾-yd. dipper.
1—Type O Thew, Shop No. 1777, extra high lift, 2/3-yd. dipper, traction wheels.
1—18B Bucyrus, Shop No. 1870, traction wheels, ⅞-yd. dipper.
2—70-C Bucyrus, Shop Nos. 1195 and 1197, 2½-yd. dipper.s
3—70-ton Bucyrus Shop. Nos. 939, 977 and 1233, 2½-yd. dippers.
2—60C Bucyrus, Shop Nos. 1286 and 1388, 2½-yd.
2—Model 60 Marion, Shop Nos. 2100 and 2238, 2½-yd. dippers.
1—Model 75 Marion, Shop No. 2112, 2½-yd. or 4-yd. dipper.
1—Model 80 Marion, Shop No. 1312, 4-yd.
1—95-C Bucyrus, Shop No. 1235, 4-yd. or 5-yd. dipper.

STEAM SHOVEL PARTS

1—Boom for Marion 60 or 61 Shovel, length 35 ft., 22-ft. dipper arm, 1½-yd. dipper, long jack arms, etc.

SIDE DUMP CARS

2—20-yd. Western all steel Air Dump Cars, chain lock, vertical dump cylinders.
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5—12-yd. Oliver Hand Dump Cars.
11—5-yd. K. & J. 36-in. gauge Side Dump Cars, steel draw sills and steel lined wood beds.
8—4-yd. K. & J. 36-in. gauge Side Dump Cars, steel draw-sills and wood beds with box-girder doors.
1—4-yd. Western 36-in. gauge heavy duty Side Dump Cars, with steel draw sills and truss rod doors.
6—1½-yd. Western 24-in. gauge Side Dump Cars, with wood beds.

SPREADER CARS

1—Std. gauge Jordan Air Spreader No. 262. All steel, 100,000 lb. capacity.
2—Std. gauge Western Spreader Cars.
1—36-in. gauge Oliver Spreader Car.

LOCOMOTIVES—Standard Gauge

1—19x26 Badlwin 6-wheeled Switcher, with tender. Shop No. 48215. New 1918. Weight 62 tons. 180 lb. steam pressure.
1—19x24 Baldwin 6-wheeled Saddle Tank. Shop No. 49553, built 1918. Weight 67 tons, air brakes, 180 lbs. steam pressure.
1—18x24 Brooks 6-wheeled Switcher, with tender, Shop No. 1778. Wt., 50 tons.
1—17x24 Davenport 6-wheeled Switcher, with tender. Shop No. 1268. Steam pressure 180 lbs. Wt., 47 tons.
1—17x24 Schnectady 6-wheeled Switcher with tender. Shop No. 2956. Wt. 44 tons.
1—17x24 Porter 6-wheeled Saddle Tank, Shop No. 6065. Built 1918. Weight, 56 tons. 180 lb. steam pressure.
1—16x24 Vulcan 4-wheeled Switcher, with tender, Shop No. 1764. Steam pressure 180 lbs. Weight 40 tons.
2—16x24 Davenport 4-wheeled Switchers, with tenders. Shop Nos. 860 and 861. Steam pressure, 170 lbs. Wt., 38 tons.
1—16 x 22 C. M. & St. P. Ry., Class J-2. 4-wheeled switcher. Weight 32 tons.
1—14x20 Porter 4-wheel Saddle Tank. Shop No. 6246, Wt. 36 tons, air brakes.
1—13x18 Vulcan 4-wheeled Saddle Tank. Shop No. 3163, air brakes and air dumping arrangement. Steam pressure 180 lbs. Wt., 32 tons.
1—13x18 American Saddle Tank. Shop No. 55248, built 1916. Wt. 32 tons.
1—11x16 Vulcan 4-wheeled Saddle Tank. Shop No. 757. Wt., 20 tons.
1—11x16 American 4-wheel Saddle Tank, Shop No. 46519. Weight 21 tons. Steam pressure 165 lb. Steam brakes.
1—11x16 Davenport 4-wheeled Saddle Tank Locomotive. Shop No. 1027. Wt. 20 tons. Steam brakes.

42-IN. GAUGE

1—11x16 Vulcan 4-wheel Saddle Tank. Shop No. 3085. Steel cab, A.S.M.E. boiler, 165 lb. pressure.

36-IN. GAUGE

1—11x16 Porter Dinkey, Shop No. 6717. New in 1922. Wt. 21 tons.
1—10x16 Vulcan Dinkey, Shop No. 3266. New in 1922. Weight 18 tons, steam brakes.

24-IN. GAUGE

1—7x12 Davenport Dinkey. Shop No. 1202. Weight 9 tons.
1—7x12 Vulcan Dinkey. Shop No. 2345. Weight 9 tons.
1—6x10 Davenport Side Tank Dinkey. Shop No. 1307. Wt. 7 tons.
1—6-ton Whitcomb Gasoline Locomotive. Shop No. 1259.

DRAGLINE EXCAVATORS

3—Class 24 Bucyrus Steam, Shop Nos. 3445, 3500 and 3671, skids and rollers, 85-ft. to 100-ft. booms; 3½, 4½ or 5-yd. Page buckets.
1—Class 14 Bucyrus, steam. Shop No. 3387, caterpillars, 60-ft. boom, 2-yd. Page bucket.
1—Class 7 Bucyrus, steam, skids and rollers, 42-ft. boom, 1-yd. Page bucket.
1—30B Bucyrus, steam. Shop No. 3641, caterpillars, 40-ft. boom, 1-yd. Page bucket.
1—20-B Bucyrus, steam. Shop No. 3955. New 1923, caterpillars, 35-ft. boom, ¾-yd. Page bucket.
1—Model 210 P & H, gasoline, Shop No. 1077, New 1920, 48-ft. boom, 1¼-yd. Page bucket, caterpillars.

CRANES

1—20-B Bucyrus, steam. Shop No. 3955. New 1923, caterpillars, 35-ft. boom, ¾-yd. Williams clam shell.
2—Erie B Cranes, Shop Nos. 466 and 1064, 32-ft. or 36-ft. boom, ⅝-yd. Williams clam, traction wheels or standard gauge truck.
1—10-ton Industrial, 4-wheeled. Shop No. 1989. 40-ft. boom, bucket operating.
1—20-ton McMyler, 8 wheeled, Shop No. 388, 45-ft. boom, 1¼-yd. O. & S. clam.
1—Gantry Crane. New in 1919; 48-ft. boom, 15-ton cap. at 18-ft. radius; 7-ft. 10½-in. gauge, 12-ft. wheelbase, self-propelling. Base of boom 17 ft. above track. Bucket-operating drums. Wt. 50 tons.

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12—Western 4-yd. 36-inch gauge, 2-way dump cars, completely rebuilt, all new wood, immediate delivery.

12—2-yd. Western 2-way Dump cars, 24" gauge.

CRANES AND DRAGLINES

1—Brownhoist Combination Crane and Dragline on caterpillars, 40' boom, steam.

1—20-ton Browning 8-wheel Locomotive Crane, 50' steel lattice boom, bucket operating, electric lights nad outriggers. One year old.

1—Byers Auto Crane, steam, on traction wheels, 30' boom.

1—O & S Locomotive Crane, 15-ton, 8-wheel, 40' boom, M.C.B.

1—Industrial Locomotive Crane, 20 ton, 50' boom, M.C.B.

2—Erie Combination Steam Shovel & Crane, on traction wheels. 1 on caterpillars.

1—Northwest model 104, 45 ft. boom, 1 yd. Page bucket, on caterpillars.

1—Model 210, P. & H., with 50 ft. boom, 1¼ yd. Clamshell bucket, on caterpillars, gasoline.

CRUSHERS

1—No. 5 Austin Gyratory, standard drive.

1—No. 3 Telsmith Gates Gyratory Crusher.

1—12x36 Universal Jaw Crusher.

1—10x20 Climax Jaw Crusher on trucks.

1—9x14 Climax Jaw Crusher, on trucks, with elevator bins and engine.

1—9x15 Galena, Blake type Jaw Crusher.

CABLEWAY

1—1½-yd. Sauerman slack line Cableway outfit, complete for 750' span, with Thomas Steam Hoist and Sauerman mast.

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1—Complete Gravel Washing Plant, purchased new 1924, consisting of 12x36 steel frame Universal Jaw Crusher, 34' belt elevator, with 18" buckets, gear drive, 36' conveyor, 18" belt, complete gasoline engine.

1—Shaker Screen 40"x8'.

1—Washing Screen 48" in diameter x 12' with scrubber section and perforated washing pipe.

1000'—4" pipe.

Patent conical sand tanks.

1—Complete 1-yd. Pioneer cableway excavator outfit, back dump bucket.

1—¾-yd. Sauerman Slackline Bucket.

1—3-yd. Green Dragscraper Bucket.

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We have in stock over 100 Steam Hoisting Engines; single, double and triple drum; cylinder sizes ranging from 4¾x6 to 10x12.

Also complete line Swinging Engines and double drum Belt Hoists for Dragscraper work.

LOCOMOTIVES

1—Baldwin, 16x24, standard gauge, 6-wheel switcher, with tender, weight on drivers 42 tons.

1—10x16 Davenport, 20-ton, standard gauge.

4—18-ton, 36" gauge; 1 Porter, 2 Baldwins, 1 Vulcan.

3—14-ton, 36" gauge, 9x14—1 Porter, 2 Vulcans.

GASOLINE LOCOMOTIVES

1—5-ton Whitcomb type MO, 36" gauge.

3—3-ton Plymouths, 24" gauge.

1—6-ton Plymouth, 24" gauge.

4—Practically new "WHITCOMB FORDSON" 24" gauge.

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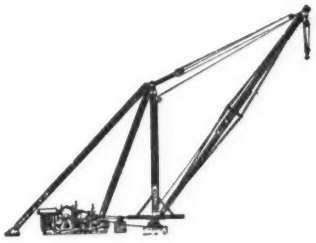
200 Tons 70 lb. Relaying Rail, first class, located in Chicago.

STEAM SHOVELS

1—Erie B, caterpillar, ¾ yd. dipper. Like new.

3—Thew on traction wheels; 2—¾ yd. dippers; 1—⅞ yd. dipper; horizontal crowding motion and shipper shaft.

2—Keystone Excavators, traction wheels, steam. 1 No. 4, 1 No. 3.



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Bull wheel, 16 ft.

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STEAM SHOVELS

1—Model 29 Osgood revolving—Shop No. 1118 (Special high lift), mounted on caterpillars, 30-ft boom, 20-ft. dipper stick, ¾-yd. dipper.

1—Little Giant, Railway type, standard gauge, standard boom equipped, 1¼-yd. dipper.

1—Model 28 Marion, standard revolving, Shop No. 2804, traction wheels, ⅝-yd. dipper.

1—Model 212, Marion, revolving, Shop No. 4620. (New Sept. 1923) mounted on trucks, 55 ft. boom, 34 t. dipper stick, 1¾-yd. dipper.

1—Model 60 Marion, Shop No. 1463. Standard gauge Railroad 2½-yd. dipper.

LOCOMOTIVES

2—Type 0-6-0 Baldwin, 55-ton, 6-wheel switchers, standard gauge, sloping tenders.

1—40 ton Brooks, Type 060, 6 wheel switching locomotive. Standard gauge, sloping tender.

1—70-C Bucyrus, standard, railroad Shop No. 1749, 2½-yd. dipper.

DRAGLINES

1—Class 9½ Bucyrus, steam operated on caterpillars, 45-ft. boom, 1½-yd. bucket.

1—Class 14 Bucyrus. Steam operated. On caterpillars. 60-ft boom. 2-yd. bucket.

1—Class 24 Bucyrus, steam operated, skids and rollers, 100 ft. boom, 3½-yd. bucket.

1—Monighan 2-T Walker Dragline. Oil driven, 60-ft. boom, 2 cu. yd. bucket.

1—No. 2 Monighan, steam operated, skids and rollers, 70-ft. boom, 2-yd. bucket. (New in 1921.)

1—No. 2 Monighan, steam operated, skids and rollers 80-ft. boom, 2-yd. bucket.

1—Page oil driven, mounted on trucks, 100-hp. twin cylinder, Charter engine, 72-ft. boom, 2½-yd. Page bucket.

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2—No. 14 Junior Gasoline Traction big blast hole drills. 5-in. bits. Late machines.

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2—Western Standard 36-in. Carriers—stub engine hitch—"Factory overhauled."

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1—Northwest Crawler, 40' Boom with Climax Heavy Duty Engine.
1—Marion Gas Electric Model No. 21 35' Boom; also dipper stick and ½ yd. shovel.

DRAGLINES

1—Monighan, Boom 60' with 20' extension, 2½ yd. bucket, tractions, skids and rollers. New 9x10 engine—75 HP. Johnson Boiler.

CARS

63—Western—12 Yard Dump Cars. Standard Gauge.
55—Atlas—Two-way Dump Cars, size 1 yard, 19⅝" gauge.
14—French Panama—Two-way Dump Cars, size 1 yd., 19⅝" gauge.
81—French Panama—One-way Dump Cars, 1 yd., 19" gauge.
8—Koppel—End Dump Cars, ½ yd., 14" gauge.
1—Koppel—Batch Car, ½ yd. 14" gauge.

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One—1 Lidgerwood D.C., D.D., 9x10 Skeleton Hoist, mounted on skids.
Five—5 Thomas, Type P-679, Direct Connected Single Drum Hoists, equipped with 7½ HP., 3 Phase, 60 Cycle, 220 Volt G. E. Motors, Solenoid Brakes and Reversible Control.

LOCOMOTIVES

3—American 50 ton, 6 wheeled Switchers, cylinders, 18x24 in.; drivers, 44 in. center.
2—Brooks—50 Ton, 6 Wheeled Switchers, cylinders, 18x24 in.; drivers, 44 in. center.
2—Baldwin—50 Ton, 6 Wheeled Switchers, cylinders, 18x24 in.; drivers, 44 in. center.
1—Davenport Steam Dinky—14 ton, 36" gauge.
1—Porter Steam Engine—15 ton, 36" gauge.
2—Milwaukee Gasoline Dinkys—Type F-30 C, 24" Gauge, 6 ton—Equipped with Buda Motors.

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1—25 HP. Upright Boiler, mounted on wheels.

PUMPS

4—Barnes High Pressure Force Pumps, size 5½x6, equipped with 7½ HP., 3 Phase, 60 cycle, 220 Volt Ideal Motors.
7—Gould Triplex Pumps, size 7x8.
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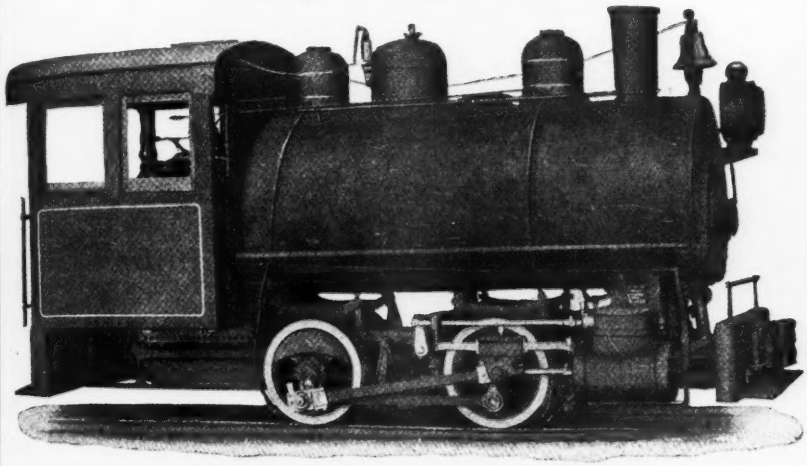

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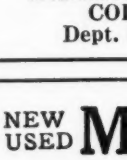

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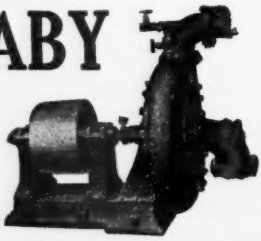

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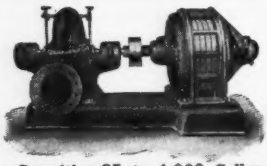

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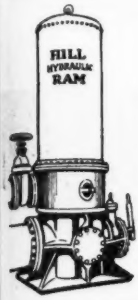

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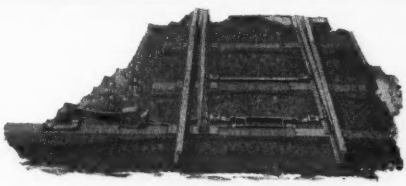

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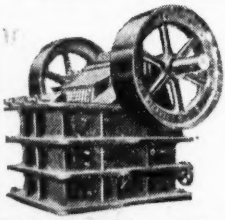

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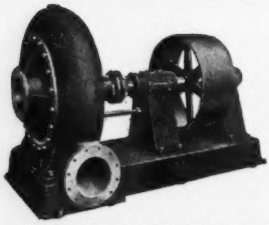

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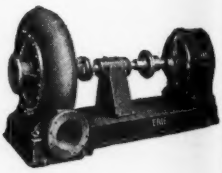

ERIE PUMP & ENGINE WORKS 153 Glenwood Ave., Medina, N. Y.

ACME SCREENING AND CRUSHING EQUIPMENT

Years of continuous service testify to the ability of Acme equipment. The name Acme in connection with pulverizers, crushers, screens, portable screening or crushing plants, or complete stationary plants, signifies the qualities that give the contractor satisfaction. Whatever your needs may be, Acme can satisfy them. Write for our catalogue.

ACME ROAD MACHINERY CO.
INC.

MAIN OFFICE AND FACTORY—FRANKFORT, N. Y.
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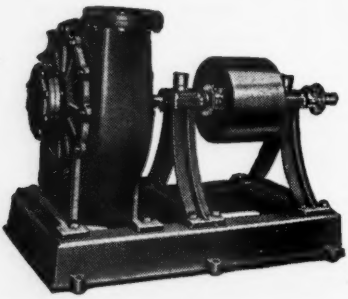


Why Not Buy Satisfaction?
Buy Lightning Pumps

Lightning Sand and Gravel Dredging Pumps have many good points, foremost among which is the superior wearing quality of their semi-steel wearing parts. Satisfactory pumping service is guaranteed by smooth operation, large capacity, simplicity of design and strength.

There are other highly specialized features. Write today for details.

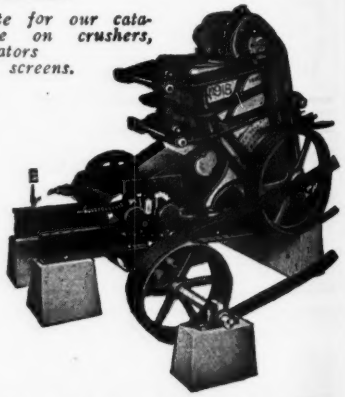
KANSAS CITY HAY PRESS CO.
KANSAS CITY, MO.

—New Holland—
The Efficient Crusher

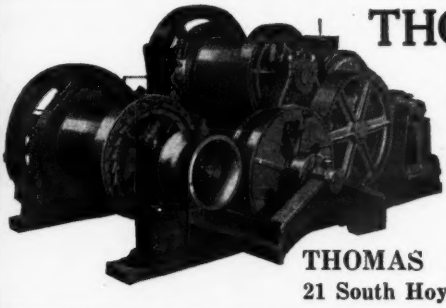
And New Hollands are efficient, not because we say so, but because they have proven so under all conditions.

For fine crushing investigate New Hollands. A size to meet your requirements.

Write for our catalogue on crushers, elevators and screens.



New Holland Machine Co.
Franklin Street, New Holland, Pa., U. S. A.



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For Slackline Cableways, Drag Scrapers or any other class of service where two speeds and two capacities are required.

Write for Catalogue.

THOMAS ELEVATOR COMPANY
21 South Hoyne Avenue CHICAGO

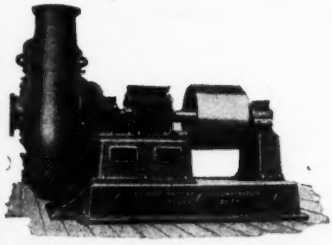

Fig. 334—Heavy Duty Dredge Pump.
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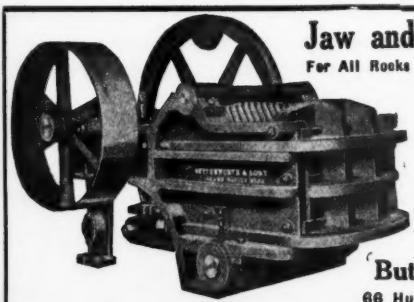
ELLICOTT MACHINE CORPN.
Baltimore, Maryland, U. S. A.

HYDRAULIC DREDGES
SAND AND GRAVEL DREDGES
DREDGING MACHINERY
SAND AND GRAVEL PUMPS



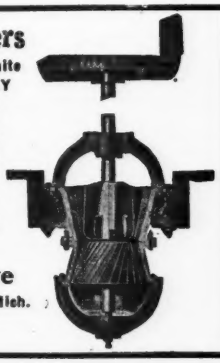
Jaw and Rotary Crushers

For All Rocks and Ores Softer Than Granite

GYPSUM MACHINERY

We design modern Plaster Mills and make all necessary Machinery, including Kettles, Nippers, Crackers, Buhrs, Screens, Elevators, Shafting, etc.

SPECIAL CRUSHER-GRINDERS FOR LIME



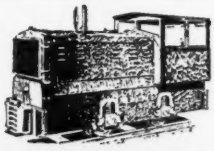
Butterworth & Lowe
66 Huron Ave., Grand Rapids, Mich.

Nippers—17x19", 18x26", 20x30", 24x36" and 26x42"

Rotaries — 20" to 47" inside diameter. Many variations.

Milwaukee Gasoline Locomotives

For Industrial Haulage



BUILT in sizes from four to fifteen tons. For all Gauges of Track. There's a size for every purpose.

Write for Catalogs M-129 and M-136.

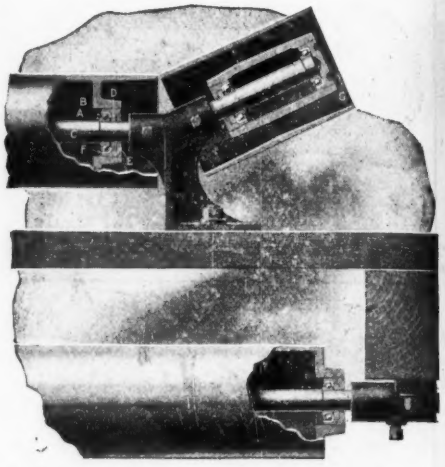
MILWAUKEE LOCOMOTIVE MFG. CO. MILWAUKEE WISCONSIN

When the service demands are hardest

It is during the rush periods, when the demands on your conveyor are excessive that the superiority of the frictionless, smooth operation and strength of Conweigh Idlers is most apparent.

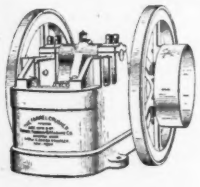
The seven following features are important factors in Conweigh Idler efficiency:

A Hardened steel "Cone", fitted on turned steel shaft.
B Pressed steel "Ball Retainer".
C Turned steel shaft, set screwed in Idler brackets.
D Oiled washer of felt or carded wool.
E Hardened steel "Plug", screwed into pulley hub.
F Brass plug for lubrication.
G Lock screw to prevent hardened plug from turning.



Write for detailed information.

THE CONVEYING WEIGHER COMPANY
90 West Street ENGINEER & CONTRACTOR New York



"FARREL" CRUSHERS
—World Famous—

Thousands in use on the hardest rock. Built in all sizes, 6"x3" to 60"x48". Complete rock crushing plants designed and equipped, also sand and gravel, washing and screening plants.

Send for latest bulletin E.

Earle C. Bacon, Inc., Engineers, 26 Cortlandt St., New York

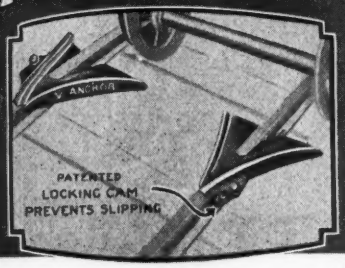
AUSTIN
Gyratory Crushers
Portable and Stationary Plants

Capacities, 5 to 300 tons per hour

Catalog 29Q tells the whole story. Write for your copy today.

AUSTIN MANUFACTURING CO.
NEW YORK CHICAGO SAN FRANCISCO

'ANCHOR' RERAILERS



Save Time and Money in Getting Cars Back on the Track

Carry a pair on every locomotive because they will pay for themselves in a week.

T. H. EDELBLUTE COMPANY
Wabash Bldg., Pittsburgh, Pa.

DAKE SWINGING ENGINES

PRODUCE
Quicker Swings
More Work
Less Trouble

The experience of use has proven them—That's why they are so universally used on bull wheel derricks.

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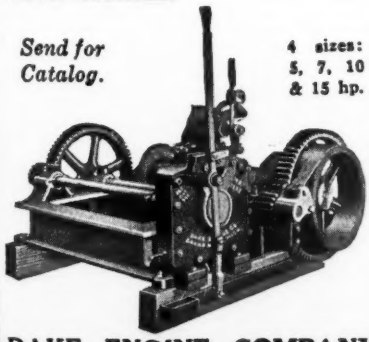
4 sizes: 5, 7, 10 & 15 hp.



DAKE ENGINE COMPANY
Grand Haven, Mich., U. S. A.

The Strongest Pipe of its Weight—

THAT tells the story of Taylor Spiral Riveted Pipe. It has the full strength of the metal plus the added strength of the riveted seam. It is strong enough for any quarry service; light enough for easy handling. Each length is fitted with unbreakable forged steel flanges. Ask for elaborate 88 page production book.

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Also manufacturers of Taylor Forge Welded pipe and fittings.

TAYLOR *Spiral Riveted* PIPE

P. & Q. 4-11—R T G

WOODHOUSE DREDGE CHAIN

Links of Iron and Cold Facts

When it comes to chain, "Links of Truth Welded Together with Cold Facts Make a Chain of Evidence Which Will Stand the Test of Scrutiny." If we talk strongly about Woodhouse Hand-Made Chains, it is because we know weak words won't do them justice.

For so important a part as chain plays in shovel work, a chain such as the "Woodhouse Trenton" grade should be used, made up of links of reliability, good service, right price, best quality steel, skilled workmanship, double testing, and the testimony of many users.

"Woodhouse Trenton" Chains combine all these qualities in a remarkable degree, and all that human foresight and ingenuity can do to insure absolute reliability is done at the Woodhouse Factory.

WOODHOUSE CHAIN WORKS
Third St., Trenton, N. J.

WOODHOUSE CHAIN WORKS,
Third St., Trenton, N. J.

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NELSON
FORDSON LOADER

THE ONLY
Fordson Loader on Wheels
that
CROWDS
WHILE ELEVATING
(Patent Applied For)

SAVES MONEY IN
Sand and Gravel Pits
Material Dealers' Yards
Handling Concrete Material

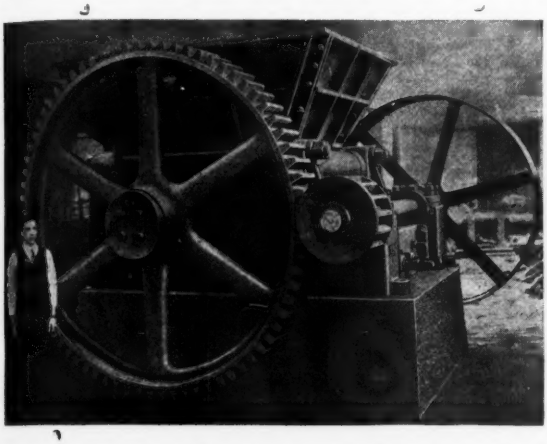
Operator stands at one side with clear view of all operations.
Cuts a wide, level path, at any grade desired.
Swivel spout permits side or end loading of trucks.
Moderate Price.

N. P. NELSON IRON WORKS, INC.
Passaic, N. J.

Combines the Advantages of 33 Years' Experience

33 years' experience in building, improving and studying crushers is bound to have far reaching results.

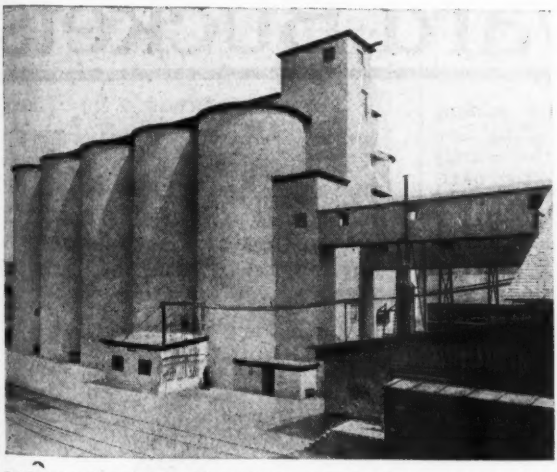
The best evidence of the results achieved by McLanahan engineers is the proved superiority of McLanahan Single Roll Crushers in many installations.



The present McLanahan Single Roll Crusher is compact, requires no apron or hand feeding, and takes wet or slimy material. It is highly efficient and economical in operation. For any material not harder than hard limestone and not high in silica.

Write for details on McLanahan Crushers, Screens, Washers, Elevators, and other special equipment.

McLANAHAN-STONE MACHINE CO.
HOLLIDAYSBURG, PA.



LAWRENCE PORTLAND CEMENT COMPANY
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Designers and Builders of
Cement Storage
Pack Houses
Slurry Tanks
Stone Bins
Power Houses
and
Machinery Installations

Designs and Estimates Furnished on Request

Burrell Engineering & Construction Co.
Jackson & Canal St., Chicago, Ill.

Model-4—Bay City One Man Excavator

THE ORIGINAL SMALL SHOVEL

OPERATES ONE HALF YARD SHOVEL-CLAM-DRAGLINE

Shipped Assembled

Silent Chain Drive

Alemite Lubricated

Convertible

Caterpillar Mounted

Several Hundred in Operation

A STURDY ECONOMICAL MACHINE FOR STRIPPING OR LOADING

For larger jobs—the Bay City ¾-yd. 16B. Also Long Boom Bay Cities in 1 and 1½ yard capacities. There's a Bay City for every size plant. Several plants have purchased their 2nd and 3rd Bay City.

BAY CITY DREDGE WORKS BAY CITY, MICH.

See P&Q HANDBOOK Page 333

Hayward Buckets

Special conditions of mining, digging or rehandling impose restrictions that only equipment designed to overcome them can help you make a profit.

Hayward Buckets are profitable because over 40 years bucket engineering experience is built into every one. Ask Hayward Engineers about buckets of every type for mining and rehandling sand, gravel and other bulk materials.

THE HAYWARD COMPANY
54-56 Church Street, New York, N. Y.

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Builders of Clam Shell, Orange Peel, Drag Scraper, and Electric Motor Bucket; Dredging, Excavating and Coal Handling Machinery.

Versatility, Economy and Portability

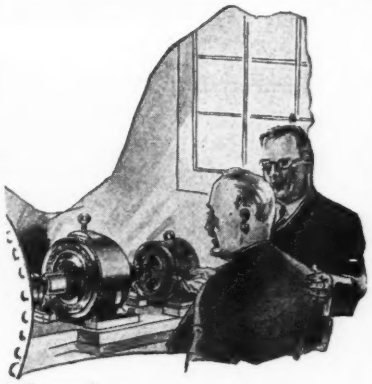
These three qualities are what make The Burch All Steel Portable Conveyor the most practical and efficient for all 'round use. Its mobility—ease of handling and operation—the facility with which it handles all kinds of material such as sand, gravel, crushed stone, bricks, coal or cinders, make it the most efficient and economical to use.

The Burch Conveyor is so constructed that all the weight can be thrown on the wheels by pulling down the end of the Elevator. It is easily raised or lowered to position. The belt runs in trough style thus carrying more material and preserving the edges. Furnished with high grade gas or electric motor. It is adaptable to loading wagons or trucks either from cars or stock pile.

Send for catalogue and prices.

THE BURCH PLOW WORKS CO.

CRESTLINE, OHIO



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Established 1895

Foote IXL Products
Cut Gears of All Kinds
Micarta Pinions
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Gear Racks
Speed Reducers
Special Machinery

Send for Free Handbook "Gear Problems"

"This Foote IXL Speed Reducer gives us a reduction of 300 to 1 and replaced 8 pulleys, 4 Jack shafts with Hangers and 4 separate belts.

We save much valuable space, improve our light, eliminate danger from exposed belts and pulleys, save a lot of power and we don't have to worry about shutdowns for repairs and adjustments."

FOOTE IXL SPEED REDUCERS

are ideal for driving Rotary Kilns, Slurry Mixers, Wash Mills, Agitators, Elevators, Conveyors, Grinders, Mixers, Screens, etc. It will pay you to clip the coupon and send for the

Free Speed Reducer Book

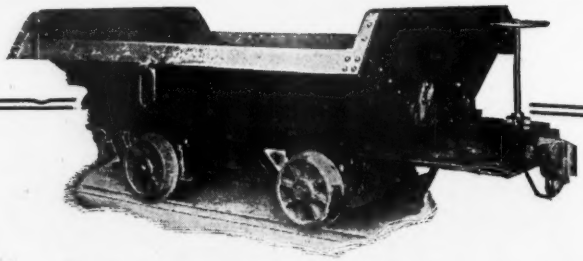
FOOTE BROS. GEAR & MACHINE CO.

235-245 N. Curtis St., Chicago, Ill.
Sales Offices in All Principal Cities U. S. A. and Canada

FOOTE BROS. GEAR & MACHINE CO.
235-245 N. Curtis St., Chicago, Ill.

Please send without obligation a copy of the IXL Speed Reducer Book.

Signed .....
Address .....



QUARRY CARS THAT ENDURE

Under Most Abusive Loading Conditions

ATLAS CARS are designed to reduce haulage costs and last longer

"They do both—Why not Investigate"

Engineering Service Especially Developed in Quarry Car Design

THE ATLAS CAR & MFG. CO.

1140 Ivanhoe Road **CLEVELAND, OHIO**

Quarry Cars, Rocker and Gable Bottom Cars, Special Cars of All Kinds

CYCLONE NUMBER FOURTEEN BIG BLAST HOLE DRILLS

Whatever success Cyclone No. 14 Big Blast Hole Drills have attained in the quarry industry during the fifteen years of their existence has been due to close adherence to the following ideals and principles:

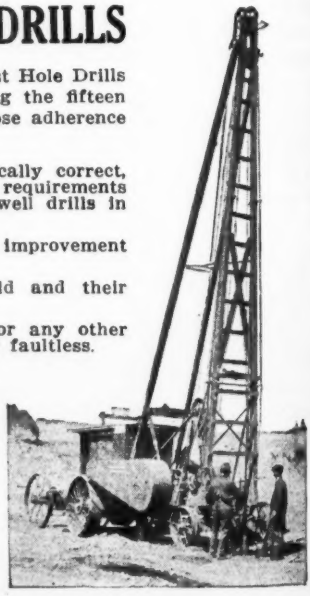
1—Starting with a design that was basically correct, originated after a close study of the requirements at the very beginning of the use of well drills in quarrying.

2—Always welcoming suggestions for improvement from quarry operators.

3—Keeping in close touch with the field and their ever-growing requirements.

4—Never holding the idea that a drill or any other piece of machinery could be perfect or faultless.

The story of the development of Cyclone No. 14 drills is completely told in our 100-page catalog B-45. It also contains 40 pages of cost and operating data on quarry drilling and blasting. Ask for a copy.



THE SANDERSON-CYCLONE DRILL CO.

Orrville, Ohio

Eastern & Export Office:
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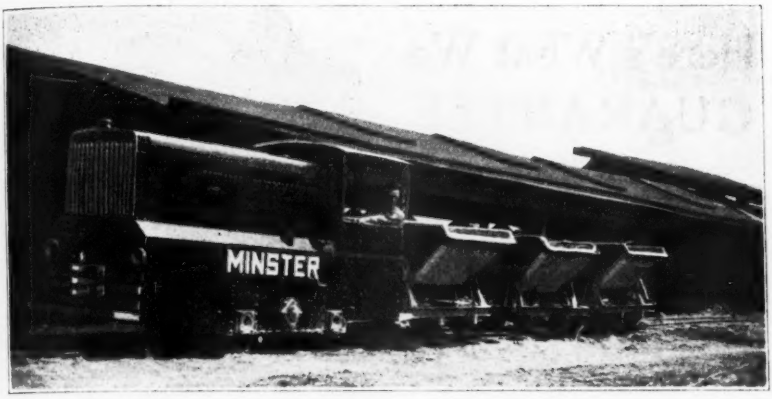


Where rugged equipment for year round service is needed you will save time and money by using our cars and locomotives.

Our quarry, Rocker Dump Type "Q" Cars are extra heavy all steel cars equipped with bronze bearings, over size axles and solid wheels having chilled treads. All castings are steel.

Likewise our MINSTER locomotives have steel frames

Write for catalogs and descriptive matter.

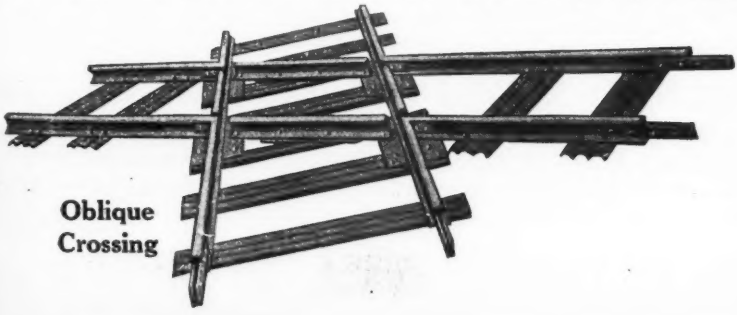
THE INDUSTRIAL EQUIPMENT CO., MINSTER, OHIO

SWEET'S TRACK MATERIALS WILL CUT YOUR OPERATING COSTS

Their light weight and portability, the ease and speed with which SWEET'S TRACK MATERIALS are laid; their sturdy strength due to their flawless and expert construction; their dependable day in and day out service under all conditions, are reasons a plenty why you should specify SWEET'S for your light track equipment.

Write for SWEET'S Catalogue—it tells the story

SWEET'S STEEL COMPANY, Williamsport, Penna.

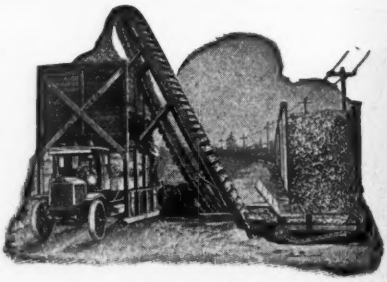


Oblique Crossing

Here's What We GUARANTEE

When equipped with proper size feeder, the SUNBURY Automatic Unloader

Will load or unload a 50-ton car in 90 minutes!



The **SUNBURY Automatic Unloader**

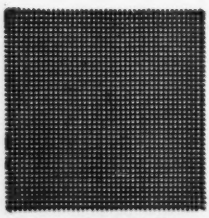
And one man can handle it. The first cost is reasonable and its return from the standpoint of its being able to substantially increase your profits makes it a very profitable investment.

Its automatic feature is important and will commend it to you. It is simple in construction, strongly built and economical in operation.

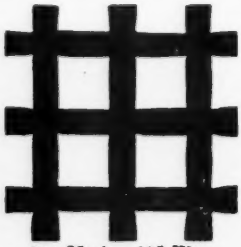
We will be pleased to send you an illustrated descriptive circular.

THE SUNBURY MANUFACTURING CO.

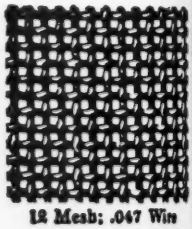
SUNBURY, OHIO



40 Mesh; .0135 Wire



2½ Mesh; .105 Wire



12 Mesh; .047 Wire

SERVICE! is the one thought behind every operation in the manufacture of—

"CLEVELAND" Double-Crimped Wire Cloth

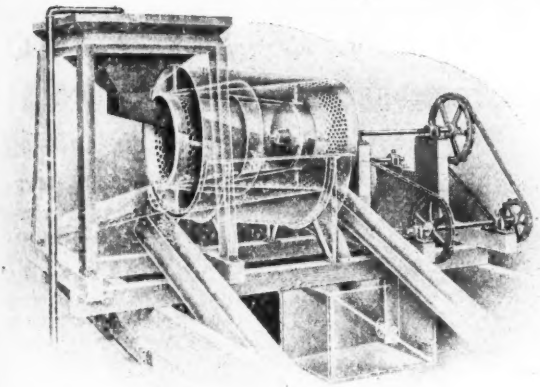
Uniform fineness and long service will be assured by its use in screening SAND, GRAVEL, CRUSHED STONE AND CEMENT.

Large stock always on hand; special mesh manufactured to suit requirements at right prices.

THE CLEVELAND WIRE CLOTH & MFG. CO.

3579 EAST 78TH STREET

CLEVELAND, OHIO



NEST
-O-
CONE
Patented
SCREENS

Let us prove to you that Nest-O-Cone patented construction will produce better sized, cleaner aggregate at less cost per ton.

Designed to eliminate objectionable features of all revolving screens.

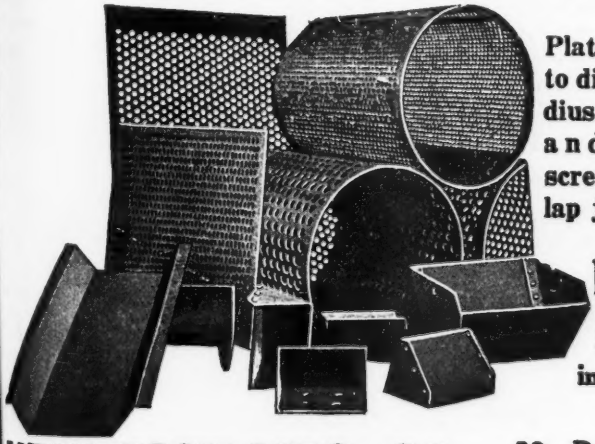
Triple scrubbing action and reversal of direction of material flow produce the results you want.

Write us for detailed information and plant layouts.

PIONEER TRACTORS, INC.

WINONA MINNESOTA

Perforated Metal Screens
FOR STONE, SAND, GRAVEL, ETC.



Plates flat; rolled to diameter or radius for revolving and conical screens butted or lap joints.

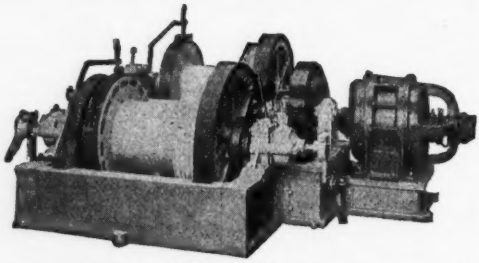
Elevator Buckets
in all styles and sizes

HENDRICK MFG. CO., 39 Dundaff Street CARBONDALE, PA.

30 Church St., New York City 954 Union Trust Bldg., Pittsburgh, Pa.

LIDGERWOOD HOISTS

STEAM—ELECTRIC—BELT DRIVE—GASOLINE



Types to suit all contractors' uses

Illustration shows our Two-Speed Electric Hoist, built in sizes up to 200 H.P., *for operating slack line drag bucket excavators* up to and exceeding two-yard capacity.

A breakdown of the engine stops your entire operation; reduces your output; increases your cost per yard. *LIDGERWOOD HOISTS have strength in every part to work continuously without break downs.*

HOISTS — CABLEWAYS — DERRICKS

LIDGERWOOD MFG. CO., 96 Liberty St., New York

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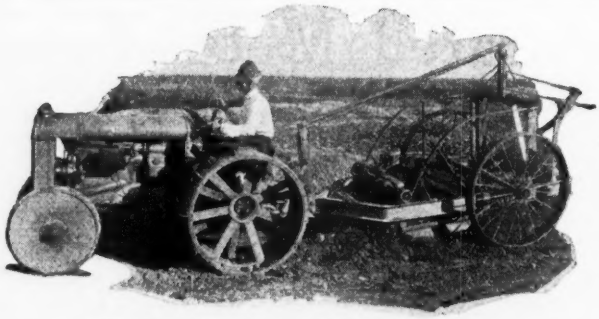

Plain Facts—Not Claims

The Miami Fordson (one-man) Power Scraper moves dirt more economically than any other equipment. This is especially true in the Pit and Quarry field as is shown by the facts and figures contained in the hundreds of letters in our files from satisfied users.

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MIAMI FORDSON one man power **SCRAPER**

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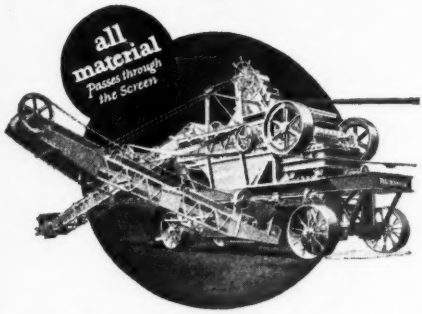
Russell Portable Screening Crushing *and* Loading Plant!



One handling of material performs all three operations — screening, crushing and loading. Conveys the material from gravel pit, screens, crushes and delivers a uniform product directly into wagon, truck or bin.

The feed back principle to crusher makes all material uniform—no oversize can pass the screen. Hopper arrangement and wide 24 inch delivery conveyor affords rapid loading of trucks. Construction of this outfit is most subtantial and durable insuring steady service and long life. Weight complete 28 500 pounds.

The complete Russell Line includes—**8 Sizes Road Machines, 2 Sizes Elevating Graders, Maintenance Patrol Machines for both Motor and Horse Power; Scarifiers, Road Drags and Wheel Scrapers, Drag Lines, Gravel Screening, Crushing and Loading Equipment, Steel Beam Bridges, etc.**

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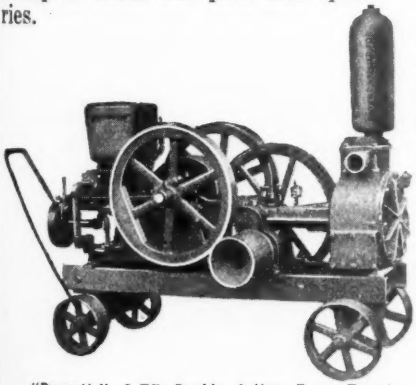
Representatives in all Principal Cities.

To rid your plant of water use "DOMESTIC" Dependable Pumps

Designed to handle water containing mud, silt, sludge, etc., this type of "Domestic" Force Pump is ideal for pits and quarries.



"Domestic" 4-TF Double Acting Force Trench Pump Unit

The Domestic Double Acting Force Trench Pump has large capacity and discharges through long pipe or hose line to suitable place for disposal. Furnished with either one cylinder or two cylinder gasoline engine, or can be geared for electric motor drive. Displacement capacities range from 80 to 150 gallons per minute.

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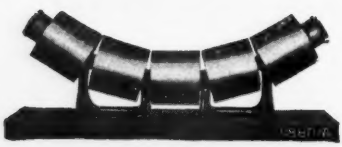

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Power Transmission Machinery—Bearings, Pulleys, Gears, Chains and Wheels, Elevating and Conveying Machinery—Helicoid Conveyor, Chain Conveyors, Elevator Buckets, Boots, Casings, etc.

THE relatively light weight of the Caldwell Belt Conveyor, in proportion to capacity, makes it a desirable form to use where conveyor must be supported on trusses of considerable span.

This type of conveyor is also well suited, at shorter distances and slower speeds, for handling lime, cement, stone, etc., in bags; or in bulk.

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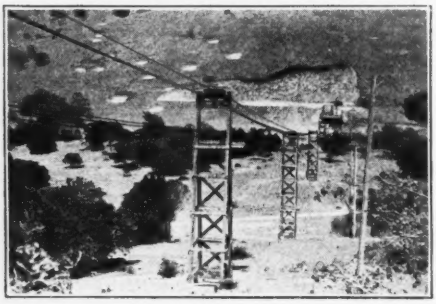

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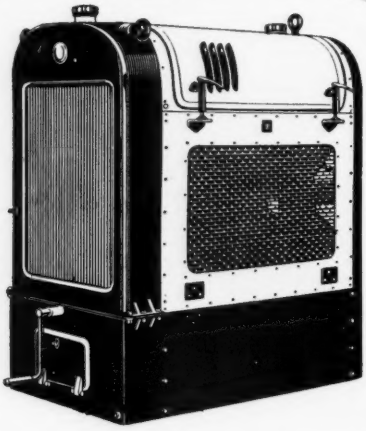

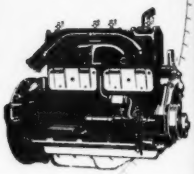

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